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PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOTS 8, 9, 10, AND 11

Volume III - Shot 8

University of Victoria
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This Volume ~~3 of this report~~ describes the photogrammetry and analysis of the particle trajectories in blast waves produced by the simultaneous detonation of two spherical 1080-lb (490-kg) Pentolite charges (DIPOLE WEST Shot 8). One of the charges was positioned at a height of 25 feet ~~(7.6m)~~ above smooth ground, and the second charge 50 feet ~~(15.2m)~~ above the first. Photogrammetrical measurements were made of the trajectories of air particle flow (over)

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20. ABSTRACT (Continued)

tracers (smoke puffs), which had been placed in a vertical grid at heights ranging from 3 feet (0.92m) to 58 feet (17.7m) above the ground and at radial distances ranging from 25 feet (7.6m) to 140 feet (42.7m) from the vertical axis through the charges. From the measured particle trajectories, calculations were made of the particle velocities, densities, hydrostatic overpressures, dynamic pressures, and total pressures throughout the blast wave, at times ranging from 3ms to 110ms after detonation of the charges. The shock front time-of-arrival were also determined from the photogrammetrical measurements for the primary shock from each of two charges, for the Mach stems produced above and below the interaction plane midway between the two charges, and for the Mach stem produced at the ground surface. From the shock front times-of-arrival, calculations were made of the shock velocities and, in turn, the peak particle velocities, air densities and hydrostatic overpressure immediately behind each shock. Calculations were also made of the variation with time of the particle velocity, density, hydrostatic overpressure, dynamic pressure, and total pressure at several fixed points. Results, presented both graphically and in tables, are compared to results previously calculated for the same experiment using shock front photogrammetry. (Dewey, et al, 1975). The analytical procedures used were similar to those in Volume 1 (Dewey, et al, 1977).

as described in AD-A058 377

SUMMARY

Owing to the quantity of material to be presented, this report is divided into several volumes. Volume 1 introduced the series, described the analytical procedures in detail, and presented and discussed the results for Shot 10. Volume 2 presented and discussed the results for Shot 9. This volume presents and discusses the results for Shot 8. A subsequent volume will present the results for Shot 11, and compare the results of the four experiments. The method of analysis is common to all four experiments and is described in detail in Volume 1 only.

So that the results from the four experiments may be easily compared, they have been scaled to remove the effects of varying atmospheric conditions. (Results are scaled to a 1 kg charge weight and a standard atmosphere of dry air at 15°C at sea level.) For the most part, only scaled results are presented. Exceptions include some derived pressure-time histories, which are compared to actual gauge measurements made in the experiment.

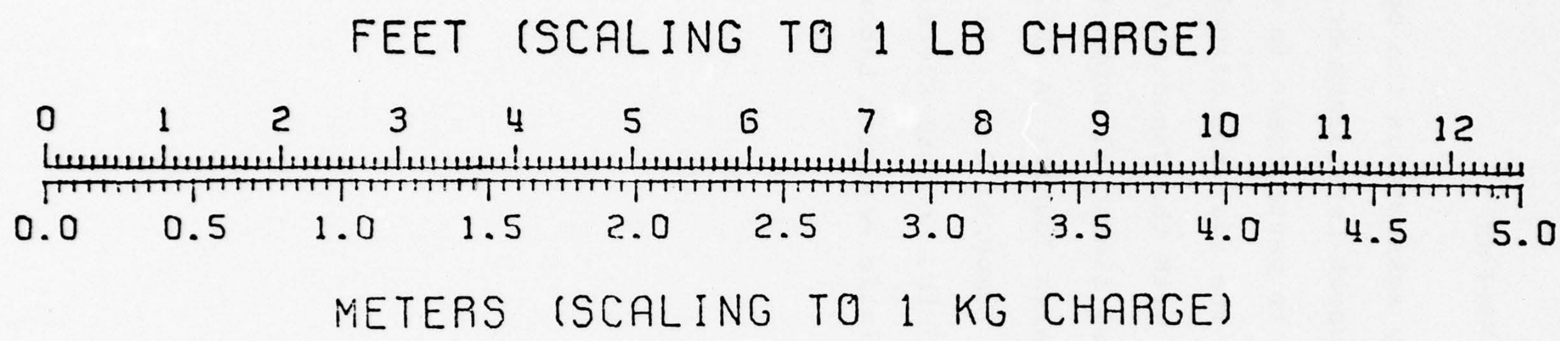
Results are presented in SI units, even though the experiments were originally laid out in British units. Only distance and time measurements are affected, however, as velocity, density, and pressure results are presented as dimensionless ratios. A distance units conversion scale is included to convert between SI units (meters scaled to a 1 kg charge) and British units (feet scaled to a 1 lb charge), plus a time scale factor and scale factors to convert pressure ratios to

both British and SI pressure units. Scale factors which may be used to compute the distance and time values actually observed under the ambient conditions of each shot are also provided. Dimensional pressure units are used for the results presented at gauge locations.

PREFACE

The authors gratefully acknowledge the opportunity offered by the Defence Research Establishment Suffield and the Defense Nuclear Agency to participate in the experiments described in this report. The analyses described here were carried out under contract with the Canadian General Electric Company, and with additional financial support from a research grant by the National Research Council (A 2952). The advice and assistance of Mr. A.P. Lambert, C.G.E. Project Officer at DRES, Dr. L. Kennedy, of the General Electric Company, and Mr. J. Keefer, of the Ballistic Research Laboratory, is also gratefully acknowledged.

Unit conversion and scaling factors



For feet scaled to a 1000 lb charge, multiply the top scale by 10.

For time scaled to a 1000 lb charge, multiply time scaled to a 1 kg charge by 8.683.

For pressure in kPa, multiply a pressure ratio (in atmospheres) by 101.325. For pressure in psi, multiply the pressure ratio by 14.696. To convert kPa to psi, divide by 6.895.

To obtain distance values actually observed for Shot 8, in meters, multiply scaled values in this report by 8.105. To obtain the observed distance values in feet, multiply the reported scaled values by 26.591. To obtain observed time values, multiply scaled time values by 8.0262. For observed pressures in kPa, multiply by 93.22; for observed pressures in psi, multiply by 13.521.

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footnote

To assist in the comparison between volumes, similar figures have been numbered indentically. For this reason, figure numbers 9, 10 and 11 are not used in this volume.

LIST OF TABLES

footnote

To assist in the comparison between volumes, similar tables have been numbered indentically. For this reason table number 6 is not used in this volume.

CHAPTER 1, SHOT 8 ANALYSIS

1.1 Introduction

This is the third volume in a series which presents the particle trajectory analysis results from four experiments (Dipole West Shots 8, 9, 10 and 11) carried out to obtain information on the interaction of spherical blast waves with real and ideal reflecting surfaces. A general description of the project can be found in Volume 1. The results presented in this volume are for Shot 8.

In each experiment, photogrammetrical studies were made of the shock fronts (refractive image analysis, RIA), and of the motions of smoke puff particle tracers (particle trajectory analysis, PTA). The refractive image analysis results were reported by Dewey et al. (1975) and results of the particle trajectory analysis are presented in this report. The method of particle trajectory analysis, common to all four shots is described in detail in Volume 1 only.

1.2 Description of Shot 8

Dipole West Shot 8 was fired on September 17th, 1973 by the Ballistics Research Laboratories at the Defence Research Establishment Suffield, in Alberta, Canada. Two 1080 lb (490 kg) spheres of Pentolite were detonated simultaneously, to within 5 microseconds, at nominal charge heights of 25 and 75ft (7.6 and 22.9m) over a relatively smooth ground surface.

Particle trajectory data were gathered by photographing the movement of smoke puffs formed in a vertical plane running out from ground zero at 6.7° south of west. A WF5 camera operating at about 3500 frames per second was positioned 30ft (9.2m) above ground level at a position 600ft (183m) due south of ground zero (GZ), the point on the ground vertically beneath the charges.

Table 1 gives the field survey data for the event, and Figure 1 shows a plan view of the layout. The dashed line represents the approximate line of sight of the WF5 camera. Figure 2 shows the field of view of this camera.

The smoke puff grid was made up of 20 columns of 12 puffs each, hung vertically on strings. The vertical spacing of puffs was 5ft, beginning 3ft above ground level and ending at a height of 58ft. The horizontal spacing of the columns of puffs was 10, 7 or 5ft, depending on the distance from ground zero, beginning at about 25ft and ending at about 140ft from GZ. Of the possible 240 smoke puffs, 237 detonated successfully. A good film record was obtained.

This report describes the analysis of the smoke puff data collected for Shot 8, and presents and discusses some of the results of that analysis.

1.3 Camera calibration and data reduction

The calculated camera position coordinates and orientation angles for Shot 8 are presented in Table 2, together with the positions of photomarkers transformed from one frame of the film just before detonation to an object plane defined as passing through ground zero and being normal to the camera orientation axis. The differences ("shifts") between the object plane positions of the transformed calibration points and their positions computed from the field survey data are given in Table 2. The object plane positions of the calibration points computed in these two ways are also shown in Figure 3.

The camera calibration procedure, described in detail in Volume 1, ensured that selected photomarker images (P1 to P5) transformed to the object plane in a way which matched them exactly to the positions computed using the survey data. These reference photomarkers for Shot 8 are indicated in Figure 3 using large circles: namely, P1 = W1, P2 = W3, and P3 = 300W1. The separation distance between P4 = P3 = 300W1 and P5 = 300W2 was also used as a calibration parameter. Photomarker VP1A was missing on Shot 8.

The image positions of two reference photomarkers (VP3B and 300W2) and all smoke puffs were measured frame-by-frame over a time interval corresponding to the approximate duration of the positive phase of the blast waves (film frames 9 to 375), and were transformed to distances in the object plane by matching the reference marker positions to their positions transformed from the calibration frame. These data were again transformed from the object plane to the smoke puff plane which was assumed to pass through "corrected" ground zero; to be vertical, and to run 6.7° south of west from GZ.

The x-y coordinate system in the smoke puff plane was the same for Shot 8 as for Shots 9 and 10 except that the corrected value for ground zero was displaced 0.8ft from the surveyed ground zero, in a direction approximately 59° north of east. The corrected ground zero was defined to have the same elevation as the surveyed ground zero, but was located directly under the midway point between the two charge centers. As for Shot 9 and 10, all data in the output plane are plotted with the x coordinate reflected, i.e. with positive values of x to the right hand side, as if the smoke grid had run to the right of the charges rather than to the left as seen in the film images.

A time was assigned to each film frame using the 1 ms timing marks placed on the film during its exposure. The film timing method was described in Volume 1, and the complete set of film timing data used for Shot 8 is provided in Table 3.

Figure 4 shows the positions of the detonated smoke puffs at a time prior to the detonation of the two charges. These positions are in the plane of the charges and the smoke puff grid, as described above. The smoke puff plane was not exactly parallel to the camera image and object planes (Figures 2 and 3), and various geometrical corrections were applied to make the transformation between them. The puffs enclosed in parenthesis were not visible in the earlier film frames because they were concealed by photomarkers, but were seen later. Charge positions in the figures are plotted as if they were positioned exactly above the corrected ground zero origin. The data shown in Figure 4 have not been scaled.

1.4 Data scaling and trajectory fitting

The position-time histories of individual smoke puffs were extracted from the frame-by-frame positions of the smoke puff grid, and then scaled to standard atmospheric conditions and charge weight. A change to SI units was made at this point in the analysis. The resulting trajectories were edited, and then smoothed by fitting polynomial functions.

Particle trajectory data were scaled by dividing all distances by Sachs scaling factor $S = \sqrt[3]{(WP_o)/(W_oP)}$ and multiplying all times by the factor $C/(C_oS)$, where C is the ambient sound speed computed for Shot 8. Data used to compute C and S, and define the scaled event, are listed below with the computed values of C and S.

Ambient temperature,	$T = 19.72\ ^\circ C$	$(67.5\ ^\circ F)$
Ambient pressure,	$P = 93.22$ kPa	(13.521 PSI)
Relative humidity,	$RH = 31.0\%$	
Computed vapour pressure,	$VP = 0.71$ kPa	(5.3 mm Hg)
Ambient sound speed,	$C = 343.635$ m/s	(1127 ft/s)

Charge weight,	$W = 489.9$ kg	(1080 lbs)
Sachs scaling factor,	$S = 8.1051$	
Standard charge weight,	$W_o = 1.0$ kg	(2.2 lbs)
Standard pressure,	$P_o = 101.325$ kPa	(14.7 PSI)
Standard temperature,	$T_o = 15$ °C	(59 °F)
Standard sound speed, (dry air)	$C_o = 340.292$ m/s	(1116 ft/s)

The results presented in this report, therefore apply to a scaled event which is the detonation of two 1 kg charges in a standard atmosphere. The scaled heights of burst for Shot 8 were 0.919 m and 2.795 m, and the scaled charge separation divided by two, was 0.938 m.

Figure 5 shows the scaled particle trajectory data for Shot 8 in the smoke puff plane with positions measured horizontally and vertically from corrected ground zero. Approximately 26509 puff positions are represented. As represented, the raw trajectory data have not been smoothed.

The raw particle trajectory data were edited to remove obvious data processing errors, such as a single point widely displaced from its trajectory for one or two frames. The trajectory of each puff in turn was then smoothed by least squares fitting simple polynomial expressions separately to both the x and y coordinate data, these being discrete functions of frame time. The adequacy of each fit was determined by examining on the same graphical output, plots of both the raw trajectory data and the fitted curve. For Shot 8 this meant examining and adjusting 474 such plots, at least two or three times each.

For a given puff, the first step in fitting the raw trajectory data was to set the time of arrival of the shock front first hitting the puff. The data at subsequent times were fitted with polynomial functions, as described in Volume 1, paragraph 2.5. The first derivatives of the fitted functions were also calculated at a series of times for use in later calculations of particle velocity.

1.5 Regionalization and shock strength calculations

Five regions were defined in the smoke puff plane on the basis of the shock front which first struck the puffs in a particular region. These are shown in Figure 6. The regions were bounded by the triple point trajectories measured using refractive image analysis (Dewey et al., 1975). Regions 1 and 2 are those in which the smoke puffs were first hit by a spherical primary shock front, and regions 3, 4, and 5 are those in which the puffs were first hit by a Mach stem.

In each of the five regions, the shock trajectory data obtained from the first movement of the smoke puffs were fitted to a function of the form

$$r(t) = A + Bt + C \log (1 + t) + D\sqrt{\log (1 + t)},$$

where r is the shock radius, t is the time after detonation, and A, B, C and D are the fitted coefficients. The shock velocities were calculated by differentiating this function. The peak particle velocity, V_s , peak density, D_s, and peak hydrostatic overpressure, P_s, as functions of shock radius in each of the five regions, were calculated from the shock velocity using extensions of the Rankine-Hugoniot equation. Details of the shock radius calculations etc. are described in Volume 1, paragraph 2.6.

1.6 Particle velocity calculations

Particle velocities were computed using the methods described in Volume 1, paragraph 2.7.

1.7 Density and hydrostatic overpressure calculations

Densities and hydrostatic overpressures in the smoke puff plane were calculated by the method described in Volume 1, paragraph 2.8. Results in both cases represent average values over cells defined by four adjacent smoke puffs.

1.8 Surface representation

Surfaces were fitted to the times of shock front arrival and to the fields of particle velocity, density and hydrostatic overpressure at a sequence of times. All data were interpolated onto a common regular Euleurian grid. Fields of dynamic pressure were computed from surface-interpolated particle velocity and density results. Contour plots were generated for all surfaces at selected times, and time histories computed at several fixed locations. The methods used were identical to those described for Shot 10 in Volume 1, Chapter 3.

1.9 Pressure and total pressure time-histories

To permit a direct comparison between results obtained from the particle trajectory analysis and measurements made using side-on and face-on pressure transducers, the hydrostatic and total overpressure time-histories were calculated at those locations coincident with guage positions within the smoke puff grid. Dynamic pressures and hydrostatic overpressures obtained from the particle trajectory analysis were used to compute the total pressures after application of a compressibility correction. This correction is a function of the local Mach number and its form depends on whether the Mach number was greater or less than unity. The time varying hydrostatic and total overpressure impulses, determined by integrating the pressure time histories, were also calculated and compared with similar integrations of the electronic transducer data.

The methods used to calculate the total pressures and the impulses are described in detail in the addendum to Volumes 1 and 2, which is incorporated in this volume. In cases where the leading edge of a time-history curve was rounded, integration of impulse was done using data interpolated linearly between the peak parameter value determined at the time of arrival, and a point on the time-history curve subsequent to the time of arrival. The second of these two points was chosen in a manner which ensured a minimum difference in slope between the interpolated and computed sections of the time-history data.

CHAPTER 2. SHOT 8 RESULTS

2.1 Times of shock front arrival

The measured initial puff positions, the times of first shock arrival, and the peak particle velocities obtained by differentiating the functions fitted to the particle trajectories are presented in Table 4. Puff position is given relative to corrected ground zero as origin, with horizontal and vertical axes. Puff position and the time of arrival of the first shock are given both as observed and scaled. Particle velocities listed are derivatives of the fitted puff trajectories at the times of shock arrival, and are expressed in Mach units. Expressed this way, the particle velocities are the same scaled as unscaled. Also listed are the initial radial puff positions (scaled) and region codes.

Shock front data determined from the first movement of the smoke puffs, i.e. calculated from the time-of-arrival data in Table 4, are listed in Tables 5.1 - 5.5. Each table corresponds to one of the 5 regions used. Listed are the observed and fitted unscaled shock trajectory data, the scaled fitted shock trajectory data, and the computed shock velocities and peak parameters associated with shock strength: peak hydrostatic overpressure in atmosphere and kilopascals, peak particle velocities in Mach units, and peak density ratios. Given as ratios, these peak parameters are the same scaled as unscaled. Pressure given in kilopascals in the tables refers to the unscaled (observed) case only.

The shock front radius versus time data derived using particle trajectory analysis (PTA) are also shown in Figures 7.1 - 7.3 for the two primary fronts, the two Mach stems at the interaction plane, and the ground Mach stem, respectively. They are compared to corresponding data derived from refractive image analysis (RIA) reported by Dewey et al. (1975). The refractive image analysis results were obtained using photogrammetry against a striped canvas backdrop and they describe the shock as it travelled in a direction almost diametrically opposite to the direction of the smoke puff grid.

2.2 Shock strengths

Peak particle velocities calculated from shock front velocities are shown in Figures 8.1 - 8.3 for the primary fronts, interaction Mach stems, and the ground Mach stem. This method of determining peak particle velocities has been labelled method 1, and the data plotted correspond to those listed in Tables 5.1 - 5.5. The results in the figures are compared with those previously obtained using refractive image analysis (RIA). In the case of the primary shock fronts, results are also compared to those of Brode (1957) for TNT.

In Volume 1 other methods of determining shock strengths in the various regions were described. It was demonstrated that method 1 was clearly the most accurate, and in the present volume shock strengths calculated using methods 2 and 3 are not reported. For this reason Figures 9, 10 and 11 and Table 6 do not appear in this volume.

2.3 Particle velocity fields

The calculated particle velocities in the plane of the smoke puffs are shown as vectors in Figures 12.1 through 12.9, for various times after the detonation. All times and positions are scaled to a 1 kg charge in a standard atmosphere. The particle velocity vectors represent the derivatives of the smoothed particle trajectories, and their magnitudes may be judged using the standard vector shown on each figure. All velocities are measured in Mach units, relative to the standard sound speed. Puffs not yet struck by a shock wave are represented by small circles (zero velocity).

Numerical data corresponding to Figures 12.1 - 12.9 are listed in Tables 7.1 through 7.12, along with scaled radial positions of the puffs, and region codes as defined in Figure 6. Conversion factors are given at the foot of each table, which may be used to convert the scaled data in the tables and figures back to their original unscaled values.

2.4 Density and hydrostatic overpressure fields

Calculated average relative densities throughout the smoke puff plane are depicted graphically in Figures 13.1 - 13.4, for various times after the detonation. All time values are scaled. Cell positions are scaled and are given relative to the corrected ground zero as origin with horizontal and vertical axes. The calculated densities may be judged using the density shading scale shown on each figure. Density is given as a ratio, relative to ambient density. Cells not yet struck by a shock wave and cells in which the density has dropped to a value less than ambient density are shown blank.

Corresponding numerical data are listed in Tables 8.1 - 8.9 along with radial cell positions computed according to the regions defined previously. Numerical data describing the fields of hydrostatic overpressure are similarly listed in Tables 9.1 - 9.9. The pressure results for a given cell were obtained by multiplying the density results for that cell by a factor determined by the strength of the shock which first traversed the cell and which then remained constant, i.e. by assuming isentropic flow after the first shock.

2.5 Times-of-arrival surface

Figure 14 shows a perspective view of the surface fitted to the original smoke puff positions and the observed times of first shock front arrival, i.e., to the data listed in Table 4.

The grid mesh size is 0.1 by 0.1 meters (scaled), about 2.5 feet square (unscaled), or about ½ that of the original smoke puff grid. The charge positions are indicated on the vertical distance axis.

The times-of-arrival surface is smooth enough to permit contouring, the contours in this case (isochrones) representing shock front shapes at different times, as shown in Figure 15, but the surface is not smooth enough to permit the calculation of gradient vectors which could be used to compute shock velocity vectors and shock strengths over the new grid.

Two attempts were made to obtain contours of shock strength. In the first, the times-of-arrival surface was smoothed by least-squares fitting low-order, one-dimensional polynomial functions to the time-of-arrival data along each grid row and column separately, and computing the derivatives of the fitted functions to obtain the associated components of the surface gradient vectors. Shock velocity vectors were obtained from the time-of-arrival gradients, and from these peak particle velocities were computed. The peak particle velocity (shock strength) surface is shown in Figure 16. The contours of this surface (not shown) did not exhibit any discontinuities across the boundaries of the shock front regions, as they would if surfaces had been fitted to the time of arrival in each region separately.

The results of a second method used to compute shock strength contours are shown in Figure 17. These were obtained by interpolating shock radius at each value of peak particle velocity shown, for each shock front region in turn, using the peak particle velocity versus radius curves shown in Figure 8. Arcs of circles with these radii, centered on the appropriate points along the vertical charge axis, were then drawn in the regions to represent shock strength contours. These peak value contours are discontinuous across triple point locii and other region boundaries. As a result, some horizontal lines are crossed twice by the same contour or, in other words, indentical shock strengths can be found at two locations the same vertical distance from a reflecting surface, but at different radial distances from the vertical charge axis.

2.6 Field surface contours

Contours of equal particle velocity, density, hydrostatic overpressure, and dynamic pressure in the blast waves were determined for a series of times, using surfaces fitted to the various measured data fields at those times. Sample results are shown in Figures 18 through 21 at scaled times of 2.5, 4.0 and 9.0 ms. The shock fronts shown in these figures are obtained from the time-of-arrival surface (as were those in Figure 15). Field contours such as those shown can be drawn for any scaled time between 0.5 ms and 13.4 ms.

It should be re-stated that all of these results were obtained from the photography of the smoke puffs only and do not rely on the results obtained using the refractive image analysis (Dewey et al., 1975).

2.7 Time histories

By mapping the physical properties of the blast waves at short time intervals its was possible to determine the time histories of these properites at any selected fixed position within the smoke puff grid. This was done at 15 fixed locations, three in the primary region of the lower charge and four in each of the three Mach stem regions, as shown in Figure 22. At each distance from the vertical axis through the charges in the Mach stem regions, each of the time history stations is approximately the same distance from either the interaction plane or the ground plane. (Particle velocity time histories could be interpolated closest to the grid edges because these were measured at puff locations, whereas the density and pressure data were measured at cell centers).

Time histories of particle velocity, density, hydrostatic overpressure and dynamic pressure at these locations are given in Figures 23 to 26. Time-histories of these physical properties of the blast wave can be provided at any other location within the smoke puff grid, on request.

The vertical line which forms the leading edge of a time-history plot represents the interpolated time-of-arrival of the first shock at the given location, and the height of this line represents the peak parameter value derived from the shock velocity analysis.

The dynamic pressures plotted in Figure 26 are maximum values, computed using both the x and y component of particle velocity. Similar plots were made of the horizontal components of dynamic pressure, but the differences were not significant since the y components of particle velocity at these locations were small. Other locations could have been chosen at which the y components would not have been insignificant.

Time histories for hydrostatic overpressure and total pressure are also plotted in Figures 27.1 to 27.4 for stations at the nominal positions of field-mounted pressure gauges on the "60 foot gun barrel". The gauges on this gun barrel were mounted at nominal elevations of 10, 20, 25, 40, 47, 50 and 53 feet. The time histories at these locations are compared to the gauge measurements (Keefer and Reisler, 1975). The total pressures were calculated in the manner described in the addendum to Volumes 1 and 2 of this report. The variation with time of the integrated pressure (pressure impulse) is also shown in these figures, compared with similar integrals of the gauge data (Keefer and Reisler, 1975).

CHAPTER 3, DISCUSSION

3.1 Particle trajectory analysis, Shot 8

The methods used to analyze the smoke puff trajectories on Shot 8 were identical to those used for Shots 10 and 9 and described in detail in Volumes 1 and 2 of this report. However, the results for Shot 10 clearly indicated the superiority of one of several methods of analyzing shock strength, and only the results of this method were reported for Shots 9 and 8.

3.2 Primary shock strength of upper charge

The refractive image analysis of the shock fronts described by Dewey et al., 1975 did not prove any information about the primary spherical shocks from the upper charges, and it was assumed that these charges had detonated satisfactorily. This assumption was validated for Shots 10 and 9 by the analysis of the particle trajectory time-of-arrival measurements. In Figure 7.1 the primary shock radii are plotted versus time for the upper and lower charges, for Shot 8, together with the results obtained for the lower charge by the refractive image analysis. All three curves appear to be identical. Unfortunately, because of the limited range of the data obtained for the primary shock from the upper charge it was not possible to calculate accurately the variation of the shock strength with distance. However, these results for the lower charge, in Figure 8.1, show an identical shock strength variation with distance to that obtained from the refractive image analysis and one which is very similar to Brode's (1957) calculations for TNT.

3.3 Comparison of Mach shocks over different surfaces

The refractive image analysis of Shot 8 (Dewey et al., 1975) showed what appeared to be a small but significant difference between the strengths of the Mach shocks over the smooth ground and beneath the interaction plane between the two charges. The results of the particle trajectory analysis given in Figures 8.2 and 8.3 do not indicate the same difference. The RIA measurements were made as close as possible to the reflecting surfaces, 0.5 m above the ground plane and 0.2 m below the interaction plane, whereas in the PTA case the results represent an average of measurements made at puff positions at heights ranging between 1.0 and 7.0 m. The results in Figures 8.2 and 8.3 therefore indicate that the difference in shock strength over the ground compared with that at the interaction plane may be dependent on the height above the ground - not an unexpected result. Determination of Mach shock strength from measurements of the times of shock arrival at smoke puffs at various heights is difficult because an assumption must be made about the exact shape of the Mach shock front, in order to correctly assign shock radius values at smoke puff positions. At or near a reflecting surface the problem of shock shape is not so important as it is assumed that the shock is perpendicular to the surface.

Details of the problem in the PTA case and the manner in which the problem was dealt with for Shots 9 and 10 are described in Volume 1 of this report.

3.4 Resolution of time histories

The time histories of density and pressure shown in Figures 24 and 25 do not normally show a sharp rise at the shock front. This slow rise is not a real effect but one inherent to the method of particle trajectory analysis, which does not permit a high resolution of density in space or in time because the average density of the air within a rectangular cell defined by four smoke puffs cannot be calculated accurately until the shock has completely traversed the cell. The time of complete traversal may be as much as 5 ms.

For the same reason the calculated time histories often anticipate the time of shock front arrival and do not resolve any weaker shocks subsequent to the first, although these shocks may be detected occasionally as a rounded bump in the normally exponentially decaying curve. Efforts are being made to improve the space and time resolution of density and pressure calculated from the particle trajectories.

The lack of resolution close to the shock front does not occur in the case of particle velocity, which can be measured with reasonable accuracy as soon as the shock has traversed the relatively small space represented by an individual smoke puff. This improved resolution is manifested also in the dynamic pressure histories which depend on particle velocity squared.

3.5 Comparisons with Gauge Results

The hydrostatic and total pressure time-histories were calculated at positions where gauges were located and the results from the particle trajectory analysis are compared with the corresponding transducer outputs in Figures 27.1 to 27.4.

On the whole the agreement between the results from the two measurement methods is reasonable although as previously discussed the poor time resolution of the particle trajectory results does not permit indentification of multiple shocks. This is illustrated in Figure 27.1 for the 60:20 location. However, the agreement between the two impulse curves is excellent.

The agreement between the pressure curves at locations 60:47, 60:50 and 60:53 in Figure 27.2 is not good. The cause of this has been traced back to the anomalous movement of a single smoke puff, at co-ordinates (1.9, 2.0) in Figure 13.2. It will be seen that this produces an unusually high density and pressure on one side of the puff and unusually low on the other side. Inspection of the film record confirms the anomalous movement of the single puff for which there is no ready explanation other than the possibility of a weak non-luminous jet from the lower charge (Patterson, et al., 1972).

The reasonable agreement between the total-pressure time-histories from the two measurement methods shown in Figures 27.3 and 27.4 further confirms the validity of the technique used to calculate the total pressure, as described in the addendum to Volumes 1 and 2 of this report.

In considering the above comparisons it must be remembered that determination of pressure time-histories was not an objective of the particle trajectory analysis project, but the reasonable agreement with gauge measurements gives some indication of the reliability of the method. Also the gauge measurements were made on the opposite side of the charges to the smoke puff grid so that some differences might be expected due to slight non-symmetries of the blast waves.

Although the effect is more clearly seen from the gauge results rather than the particle trajectory analysis, it is interesting to note the difference in the blast wave signature at location 60:10, 10ft above the smooth ground, compared with that at 60:40, 10ft below the interaction plane. Above the ground the two initial shocks indicate that the gauge was above the triple point and observed the primary and the reflected shock. Below the interaction plane the single shock indicates that the gauge was in the Mach stem below the triple point. This confirms the photogrammetrical measurements (Dewey, et al., 1975) which showed the triple point above the ground at this location to be at height of approximately 8.5 ft and to be approximately 10 ft below the interaction plane, i.e. coinciding with the gauge position.

A more detailed comparison of the blast wave properties in the Mach reflection regions above the ground and below the interaction plane will be made in a subsequent volume of this report.

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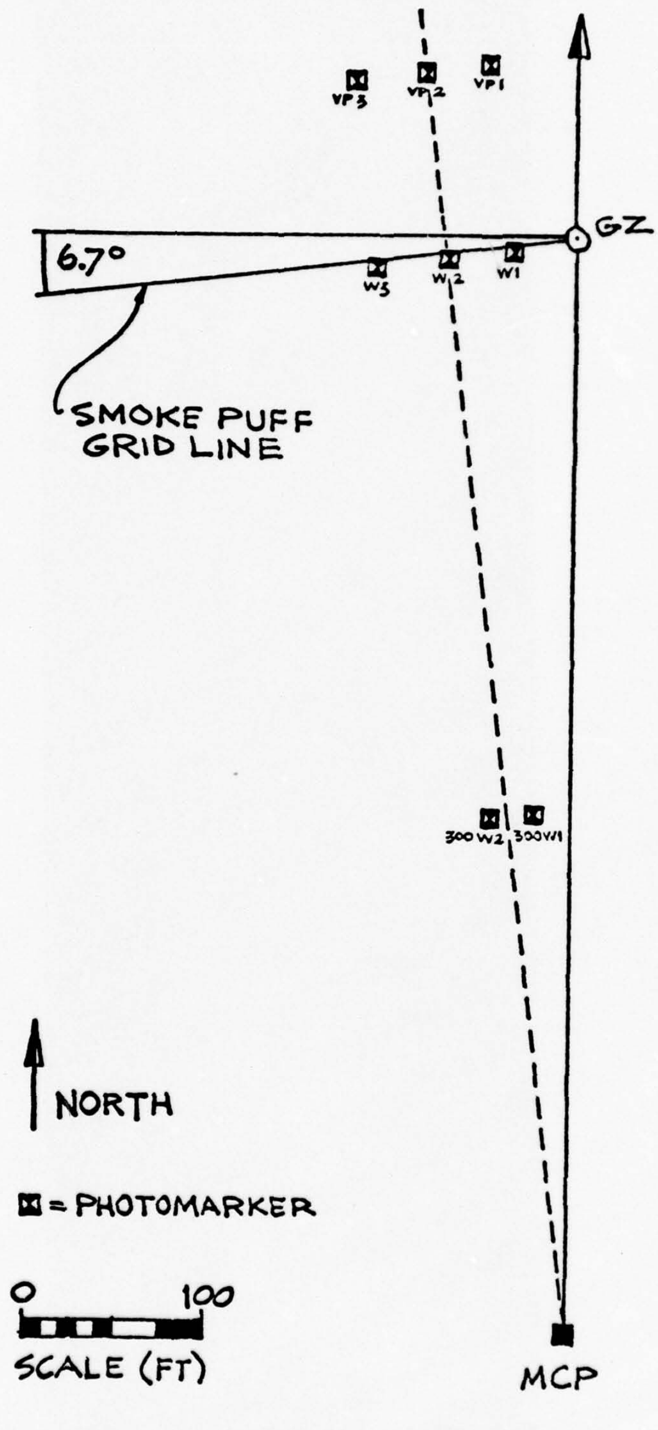

Fig. 1 Plan view of test site, Dipole West/8

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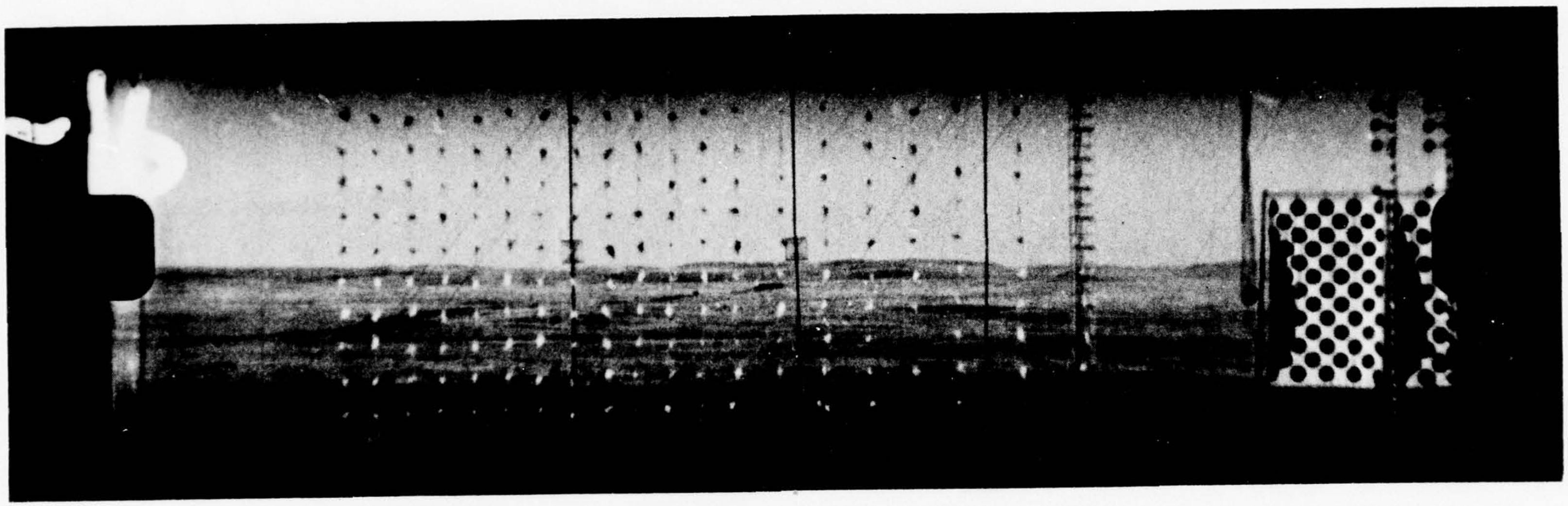


Fig. 2 Field of view of camera, Dipole West/8

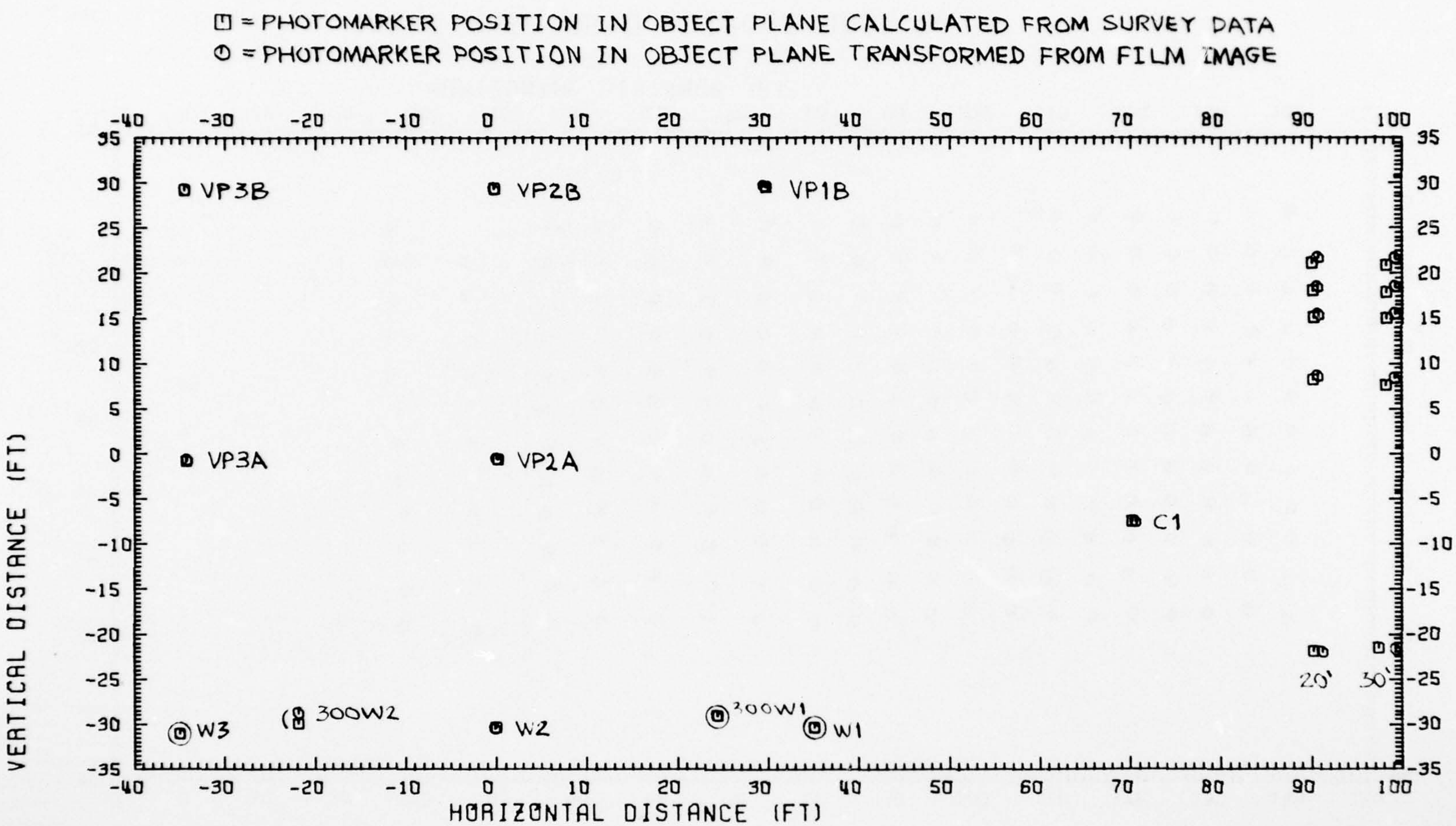


Fig. 3 CAMERA CALIBRATION, DIPOLE WEST/8

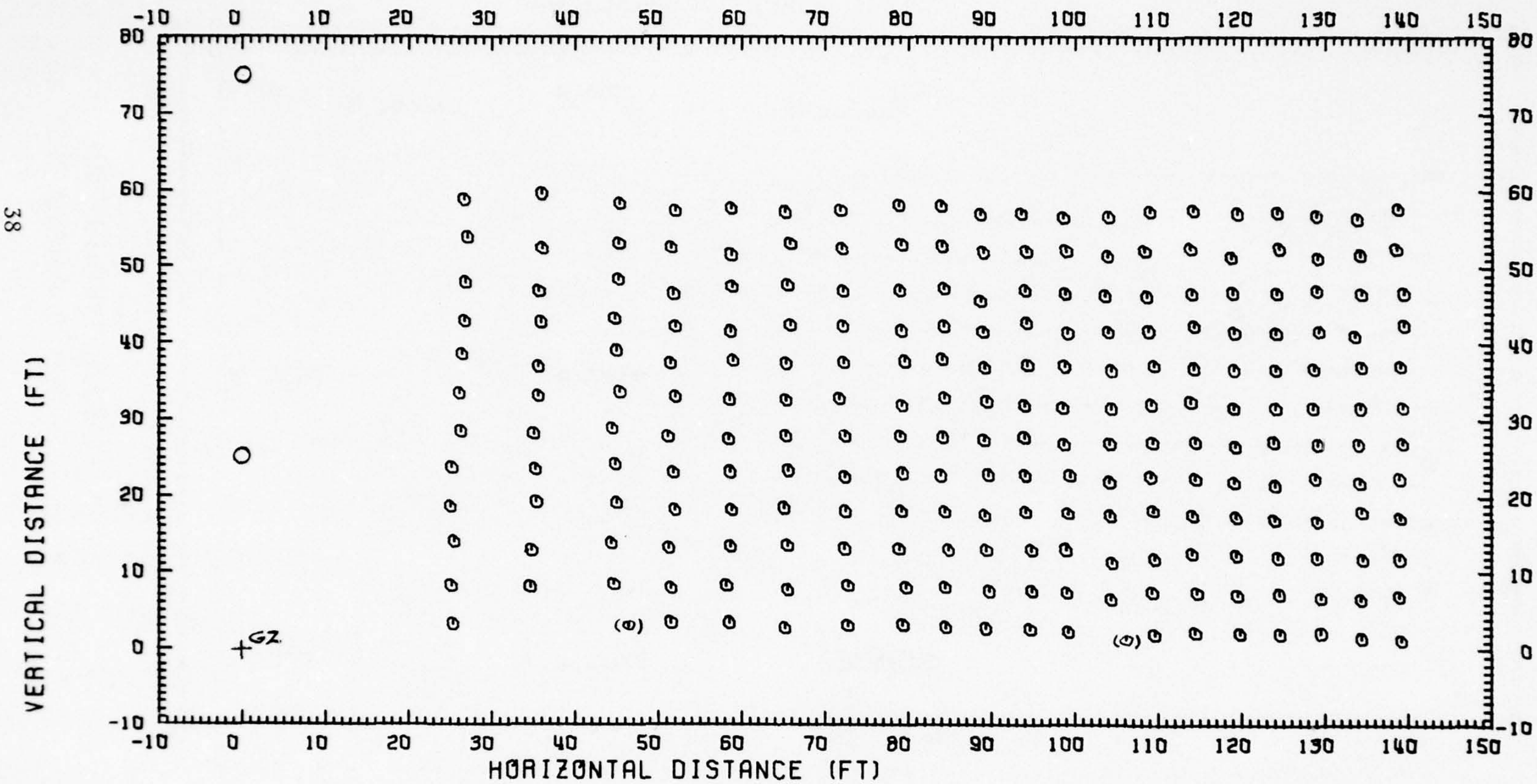


Fig. 4 SMOKE PUFF GRID, DIPOLE WEST/8

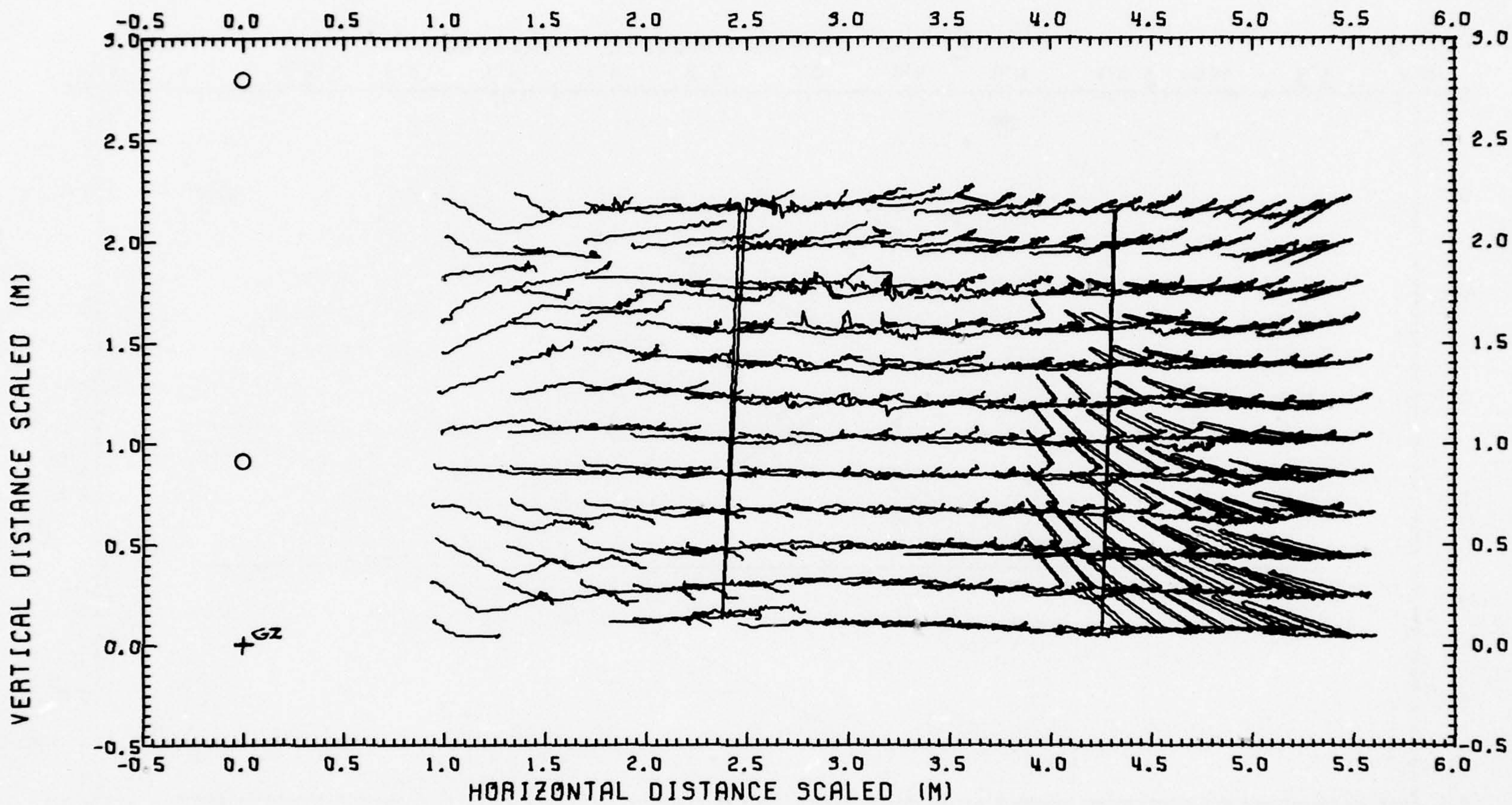


Fig. 5 PARTICLE TRAJECTORIES, DIPOLE WEST/8

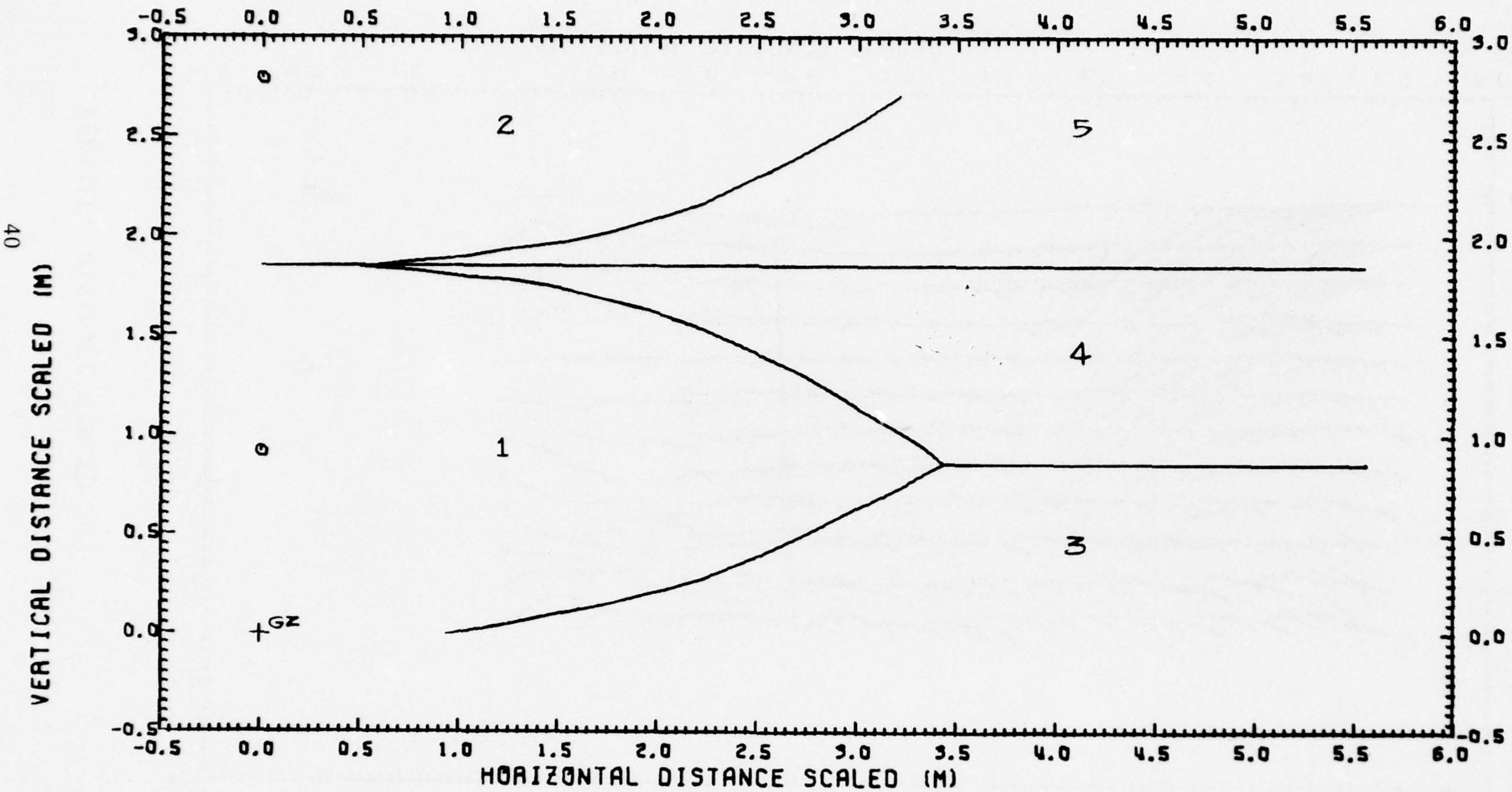


Fig. 6 REGIONS DEFINITION, DIPOLE WEST/8

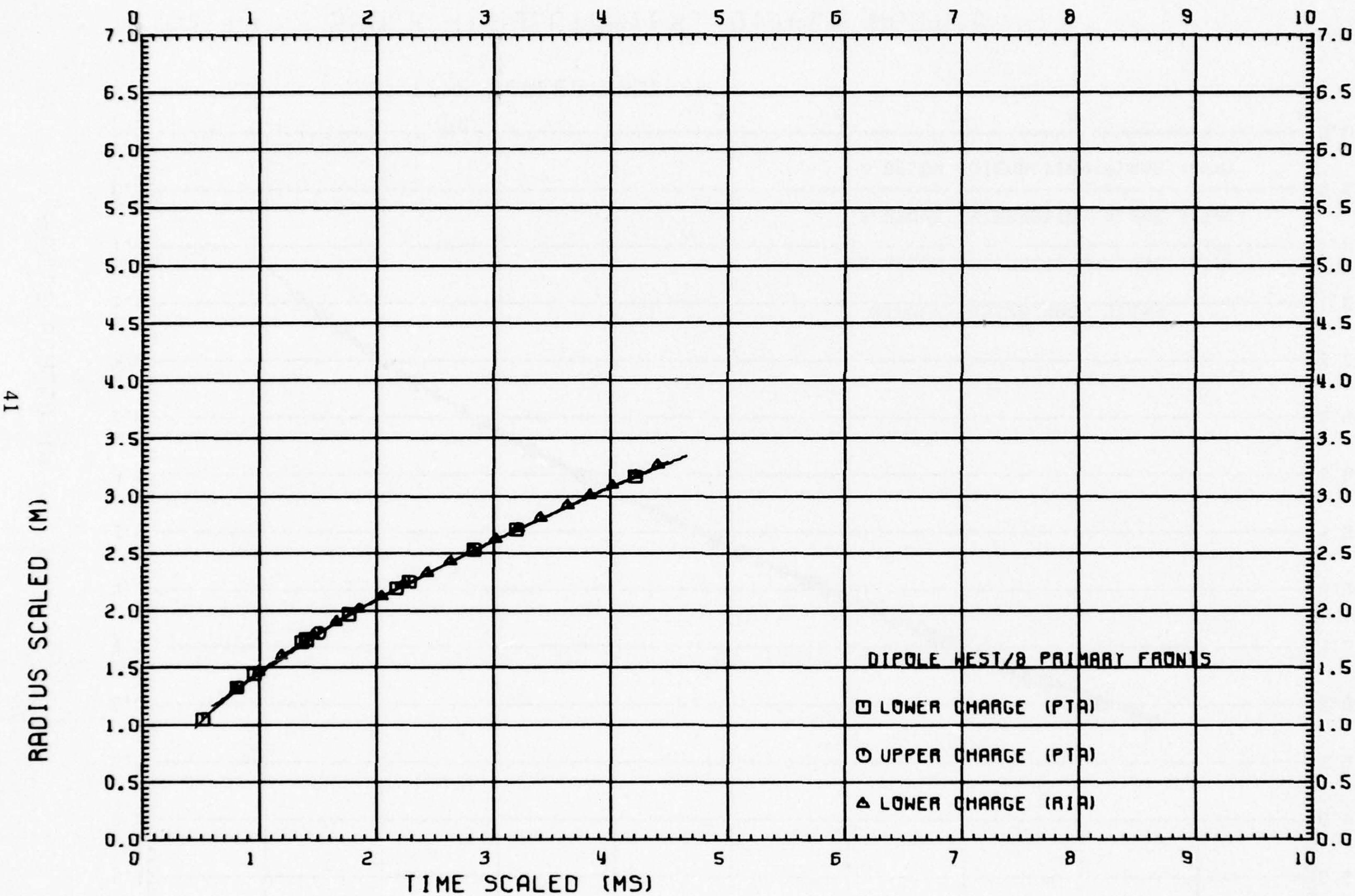


Fig. 7.1 SHOCK TRAJECTORIES, DIPOLE WEST/8

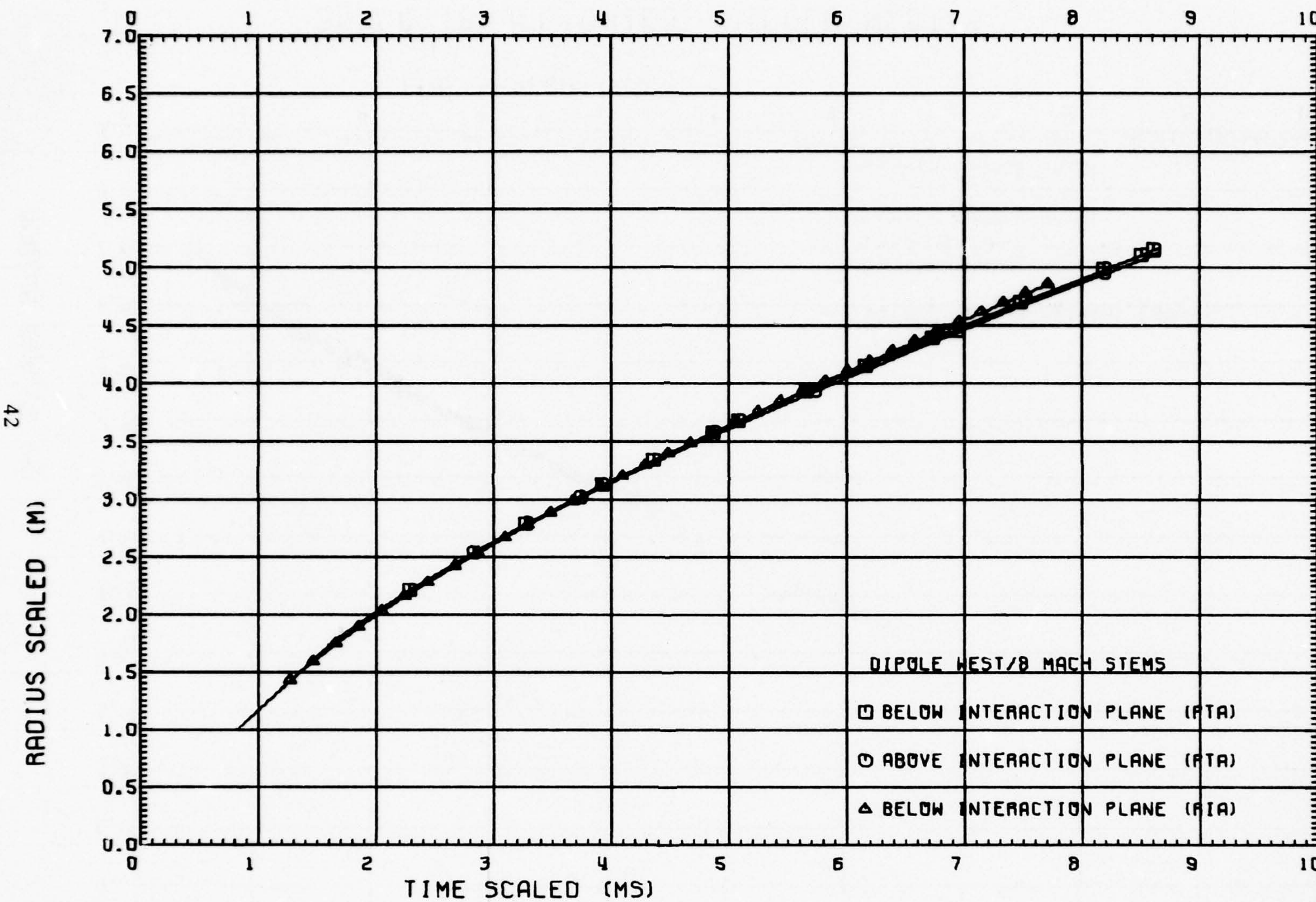


Fig. 7.2 SHOCK TRAJECTORIES, DIPOLE WEST/8

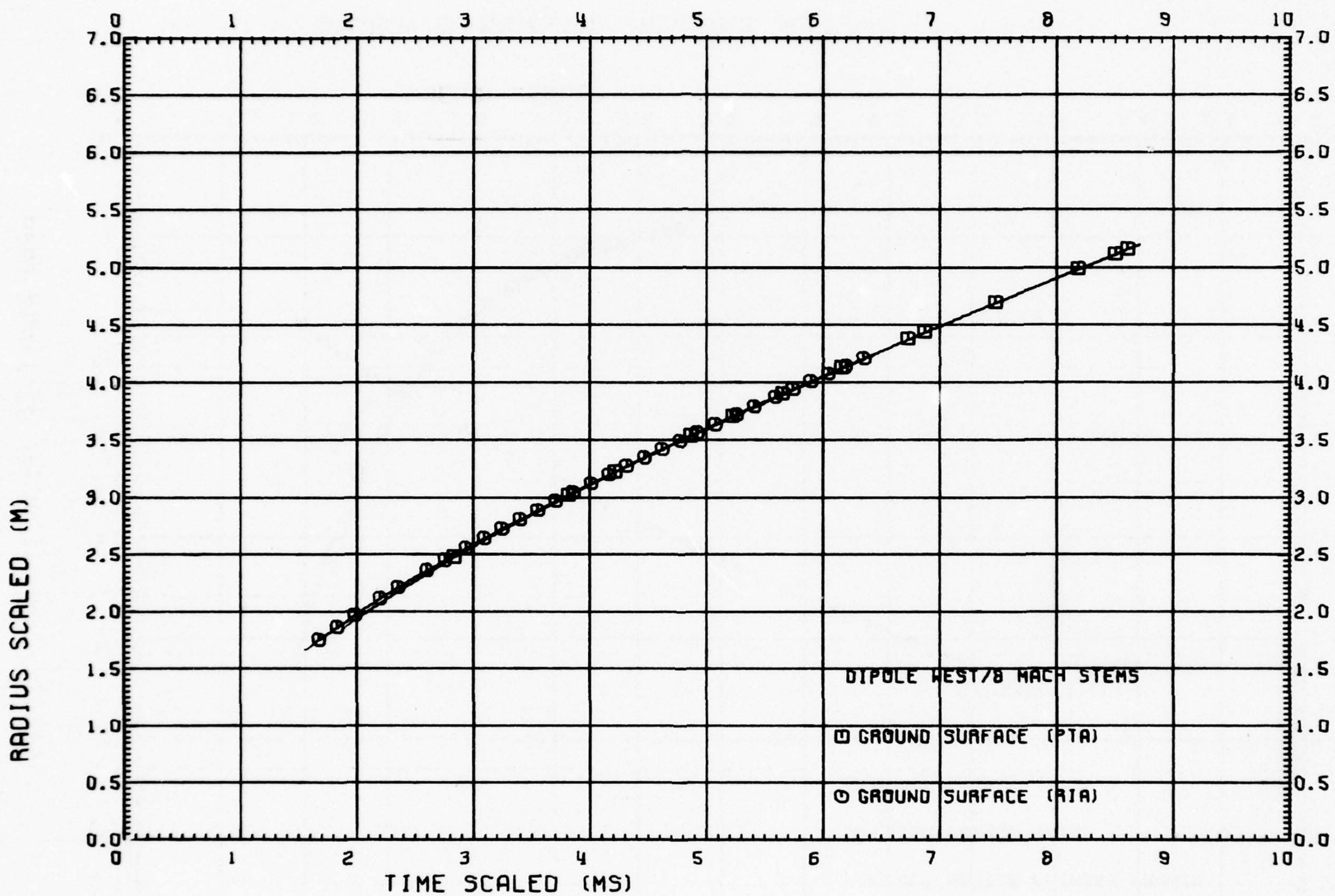


Fig. 7.3 SHOCK TRAJECTORIES, DIPOLE WEST/8

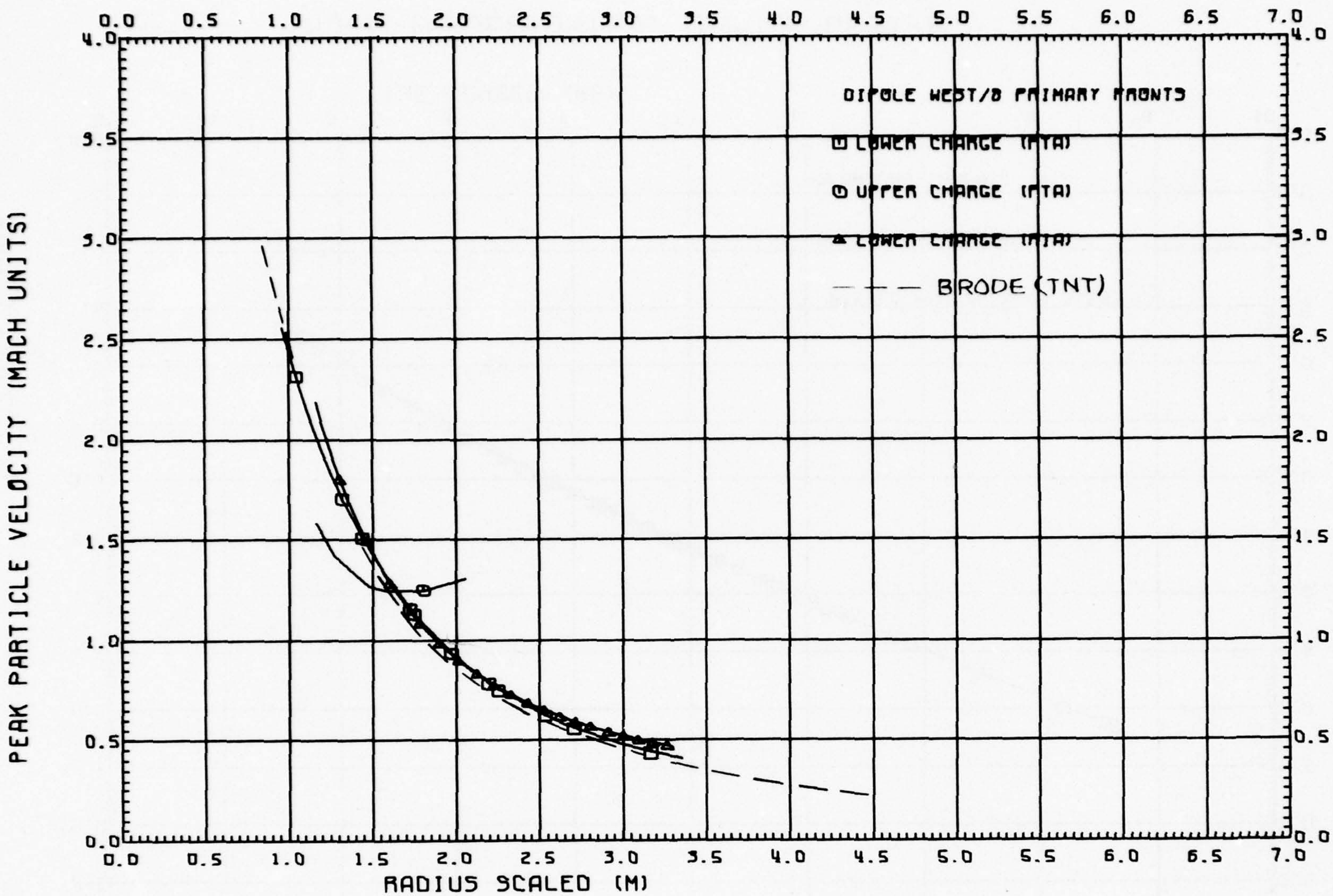


Fig. 8.1 SHOCK STRENGTH, DIPOLE WEST/8

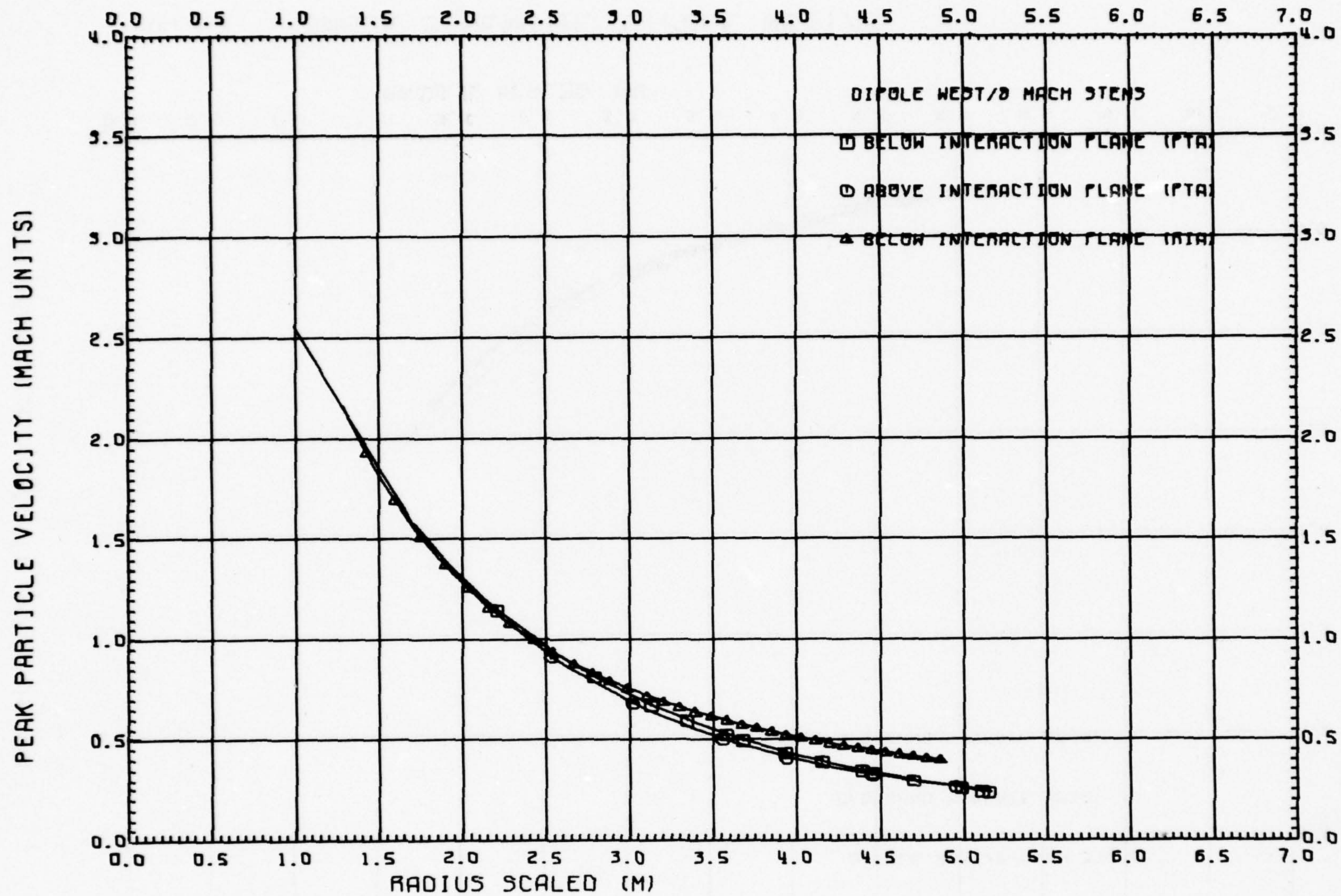


Fig. 8.2 SHOCK STRENGTH, DIPOLE WEST/8

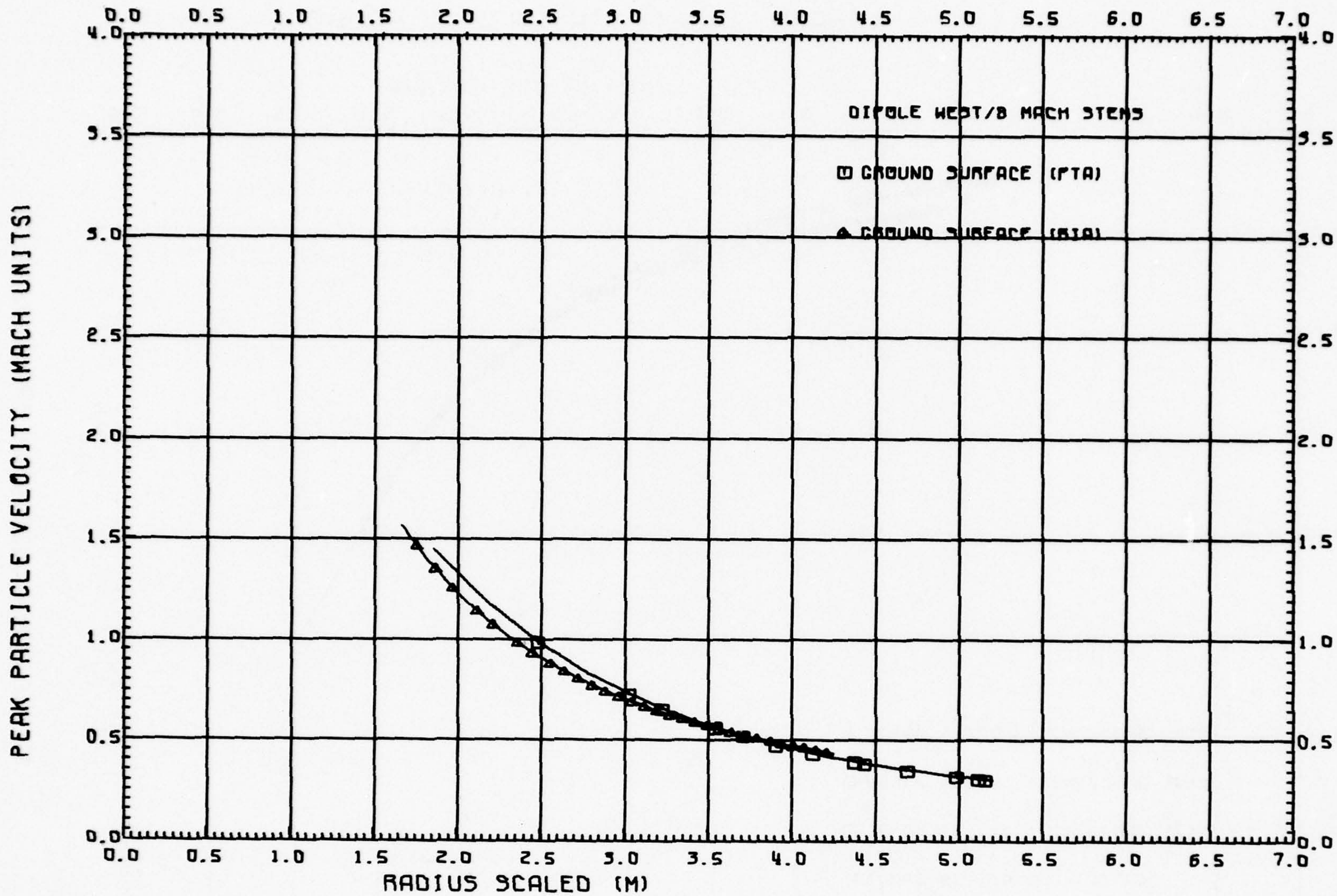


Fig. 8.3 SHOCK STRENGTH, DIPOLE WEST/8

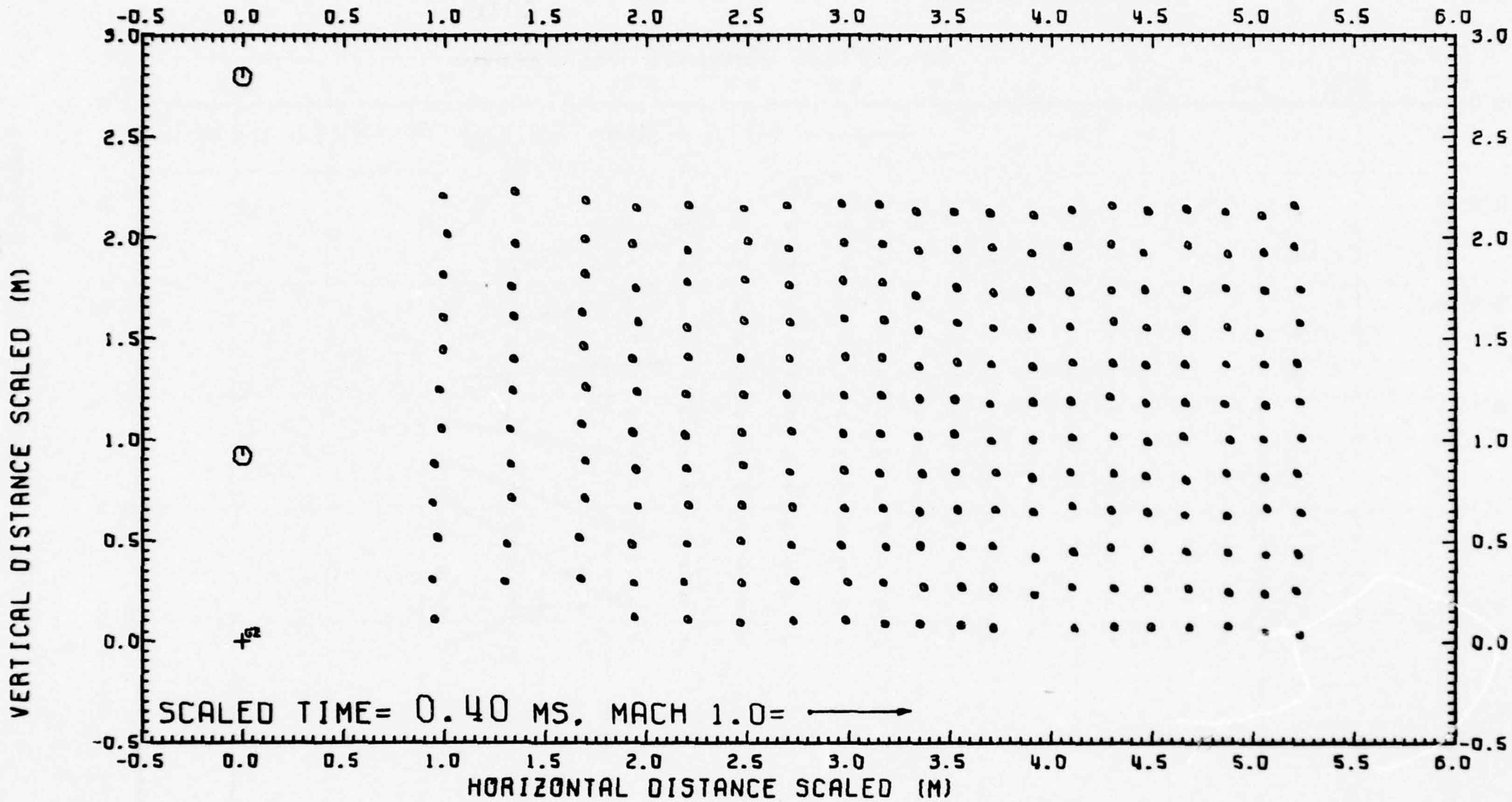


Fig. 12.1 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

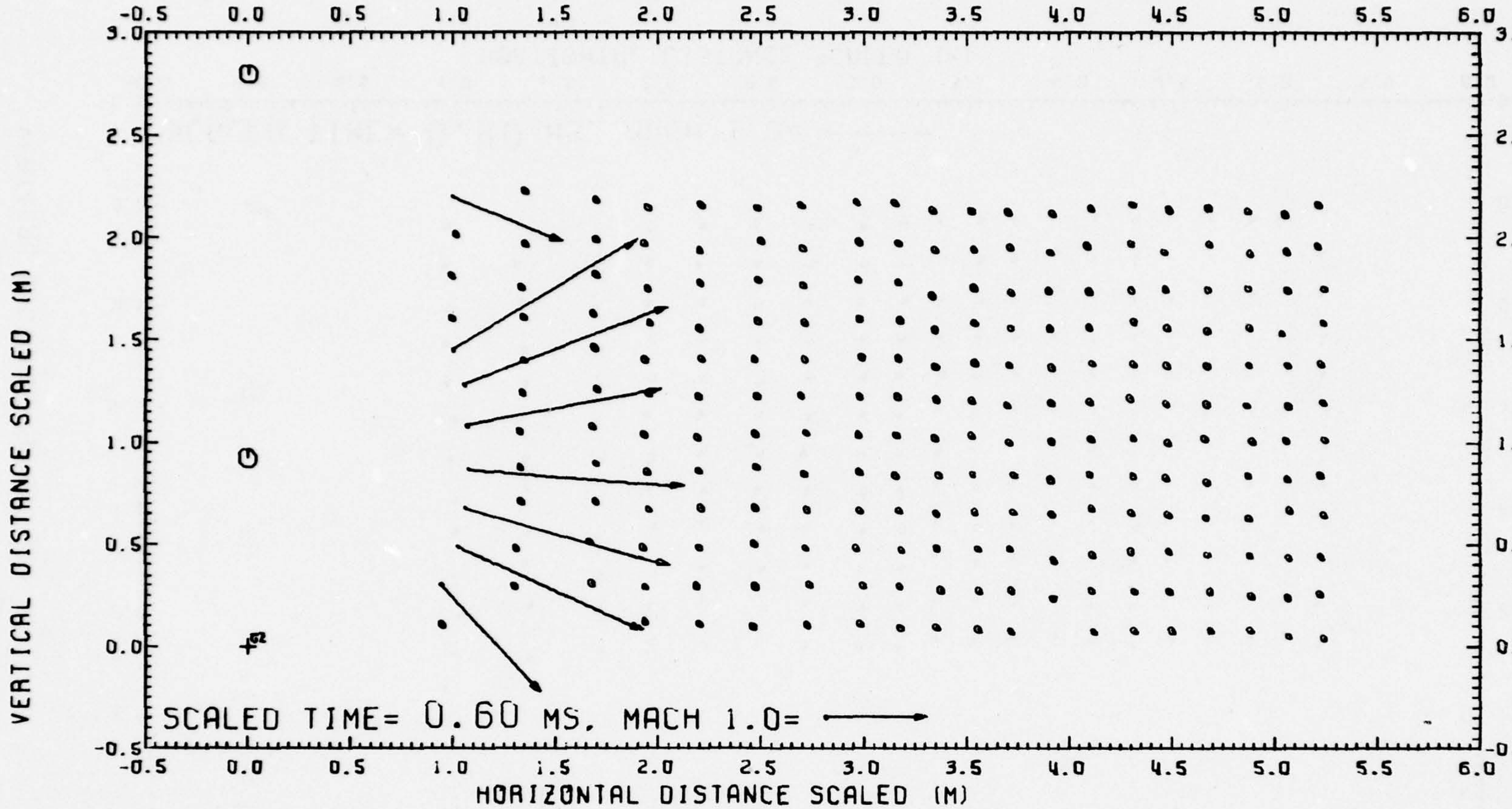


Fig. 12.2 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

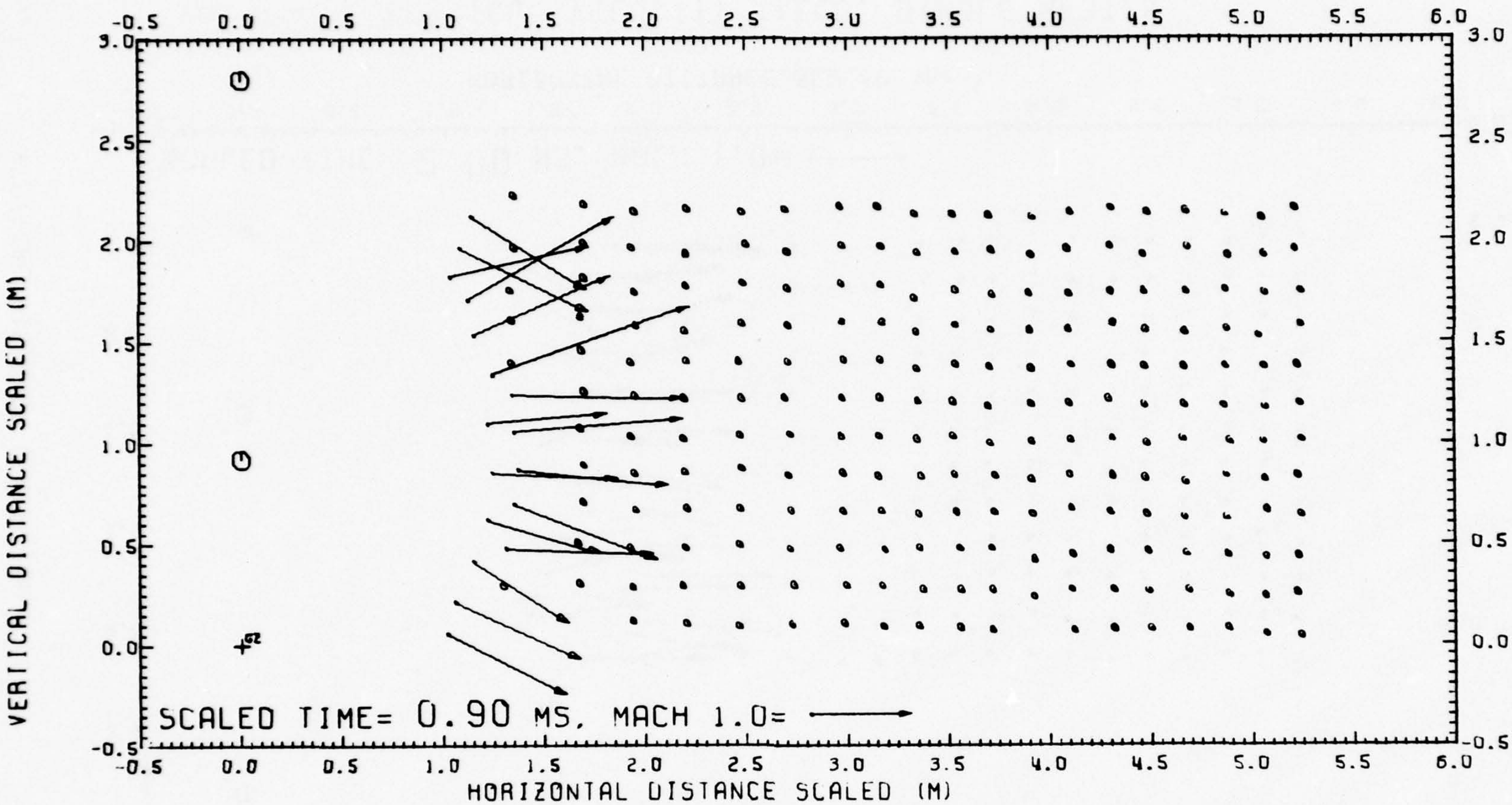


Fig. 12.3 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

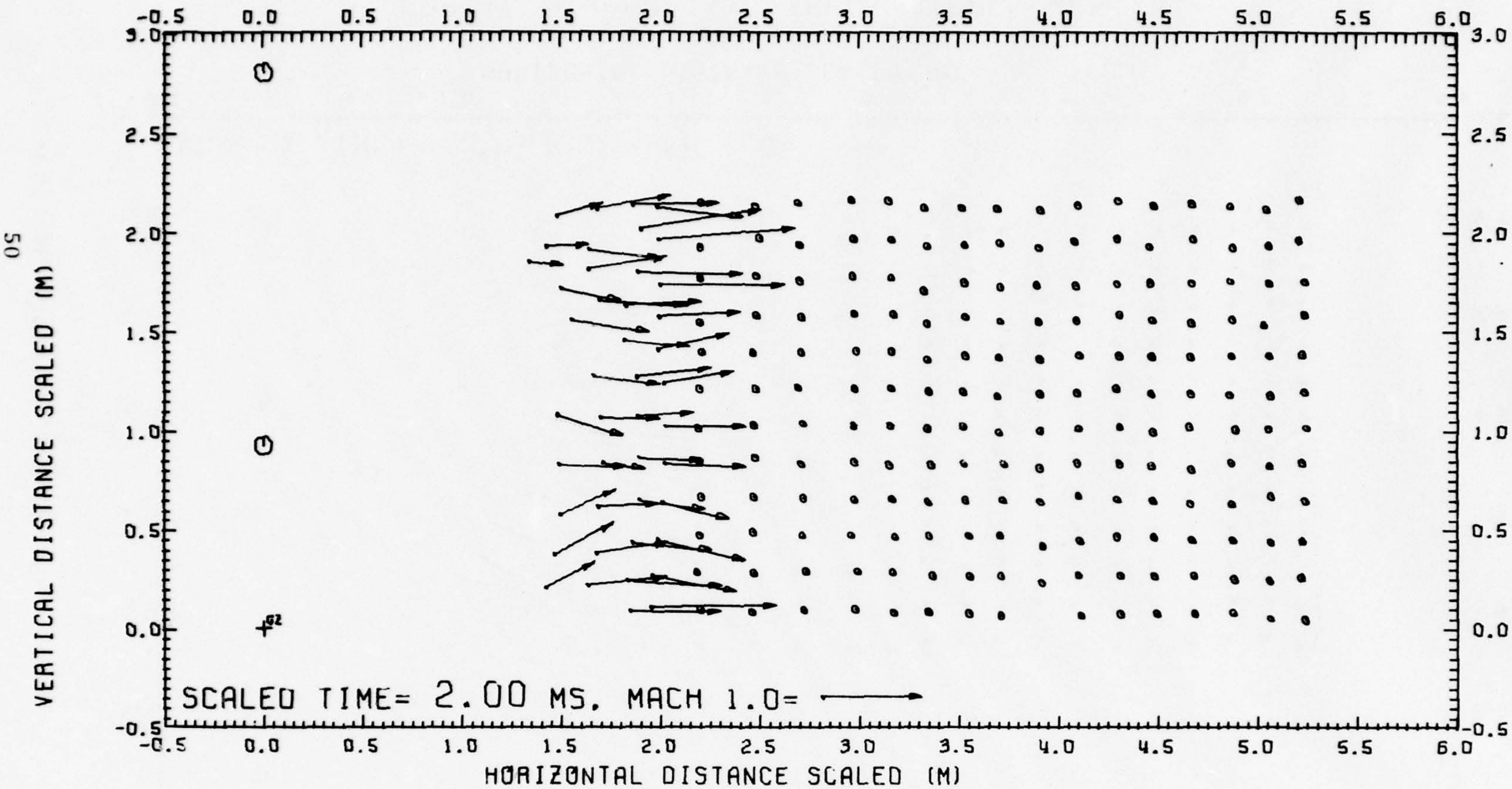


Fig. 12.4 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

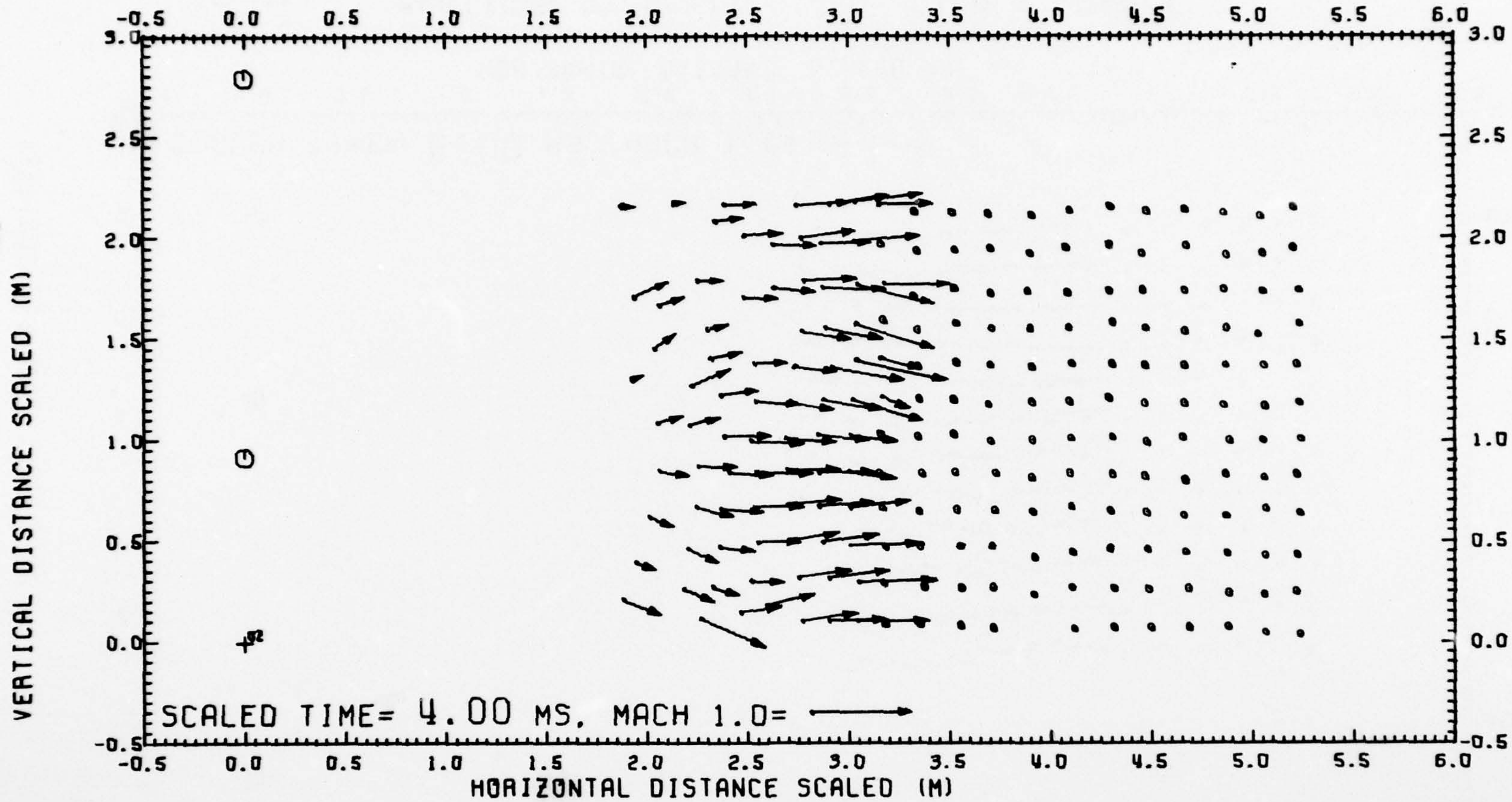


Fig. 12.5 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

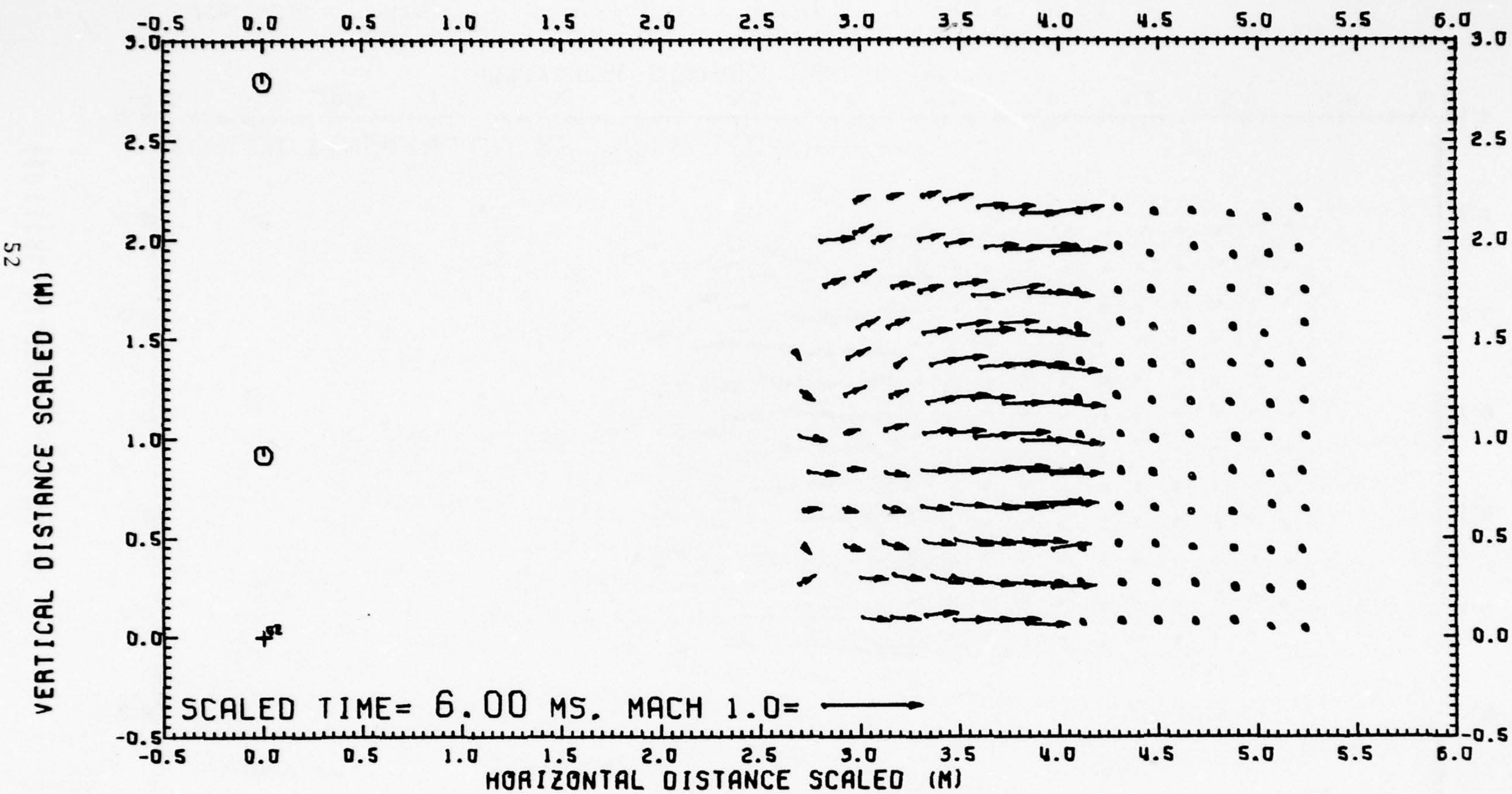


Fig. 12.6 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

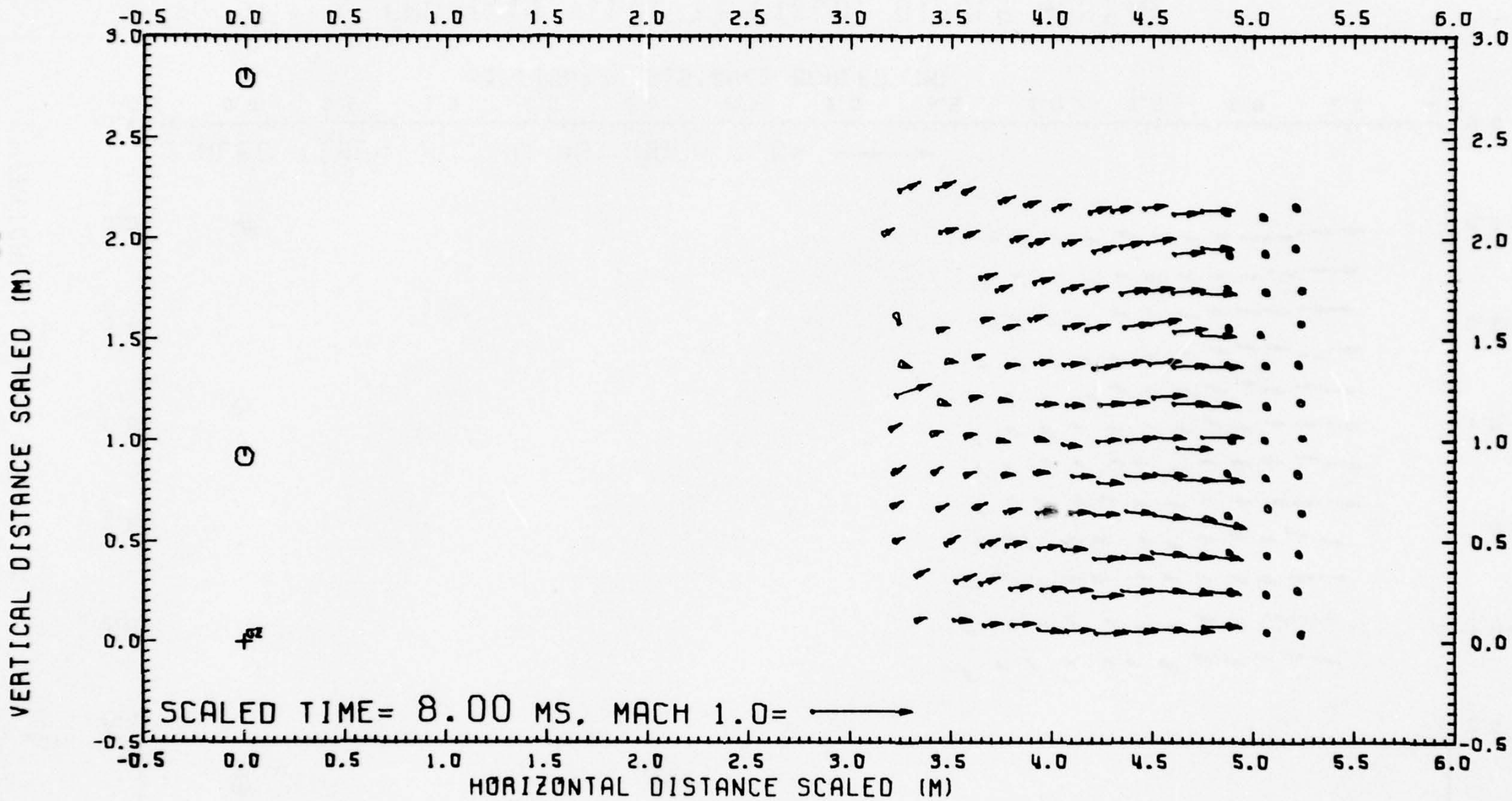


Fig. 12.7 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

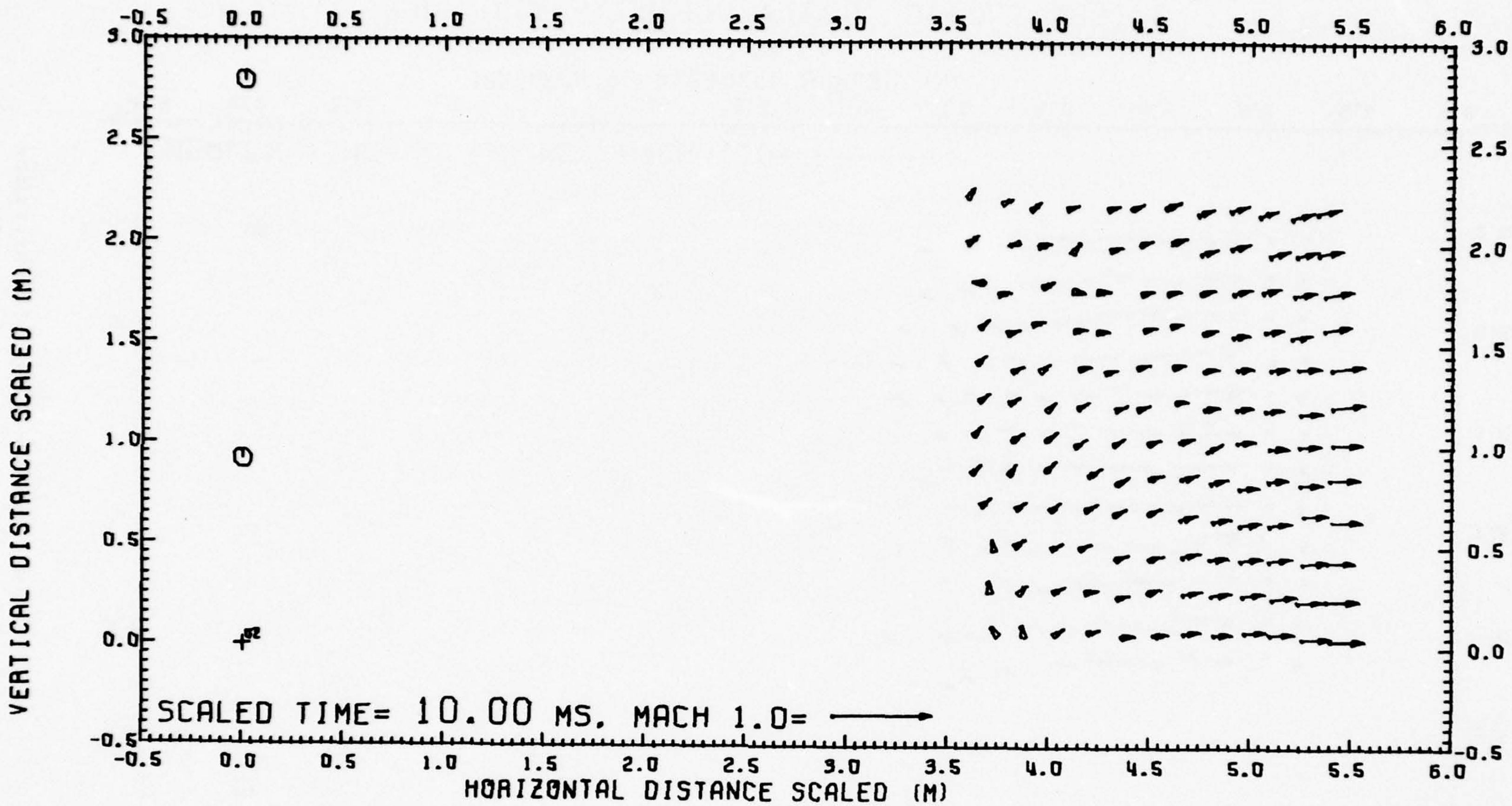


Fig. 12.8 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

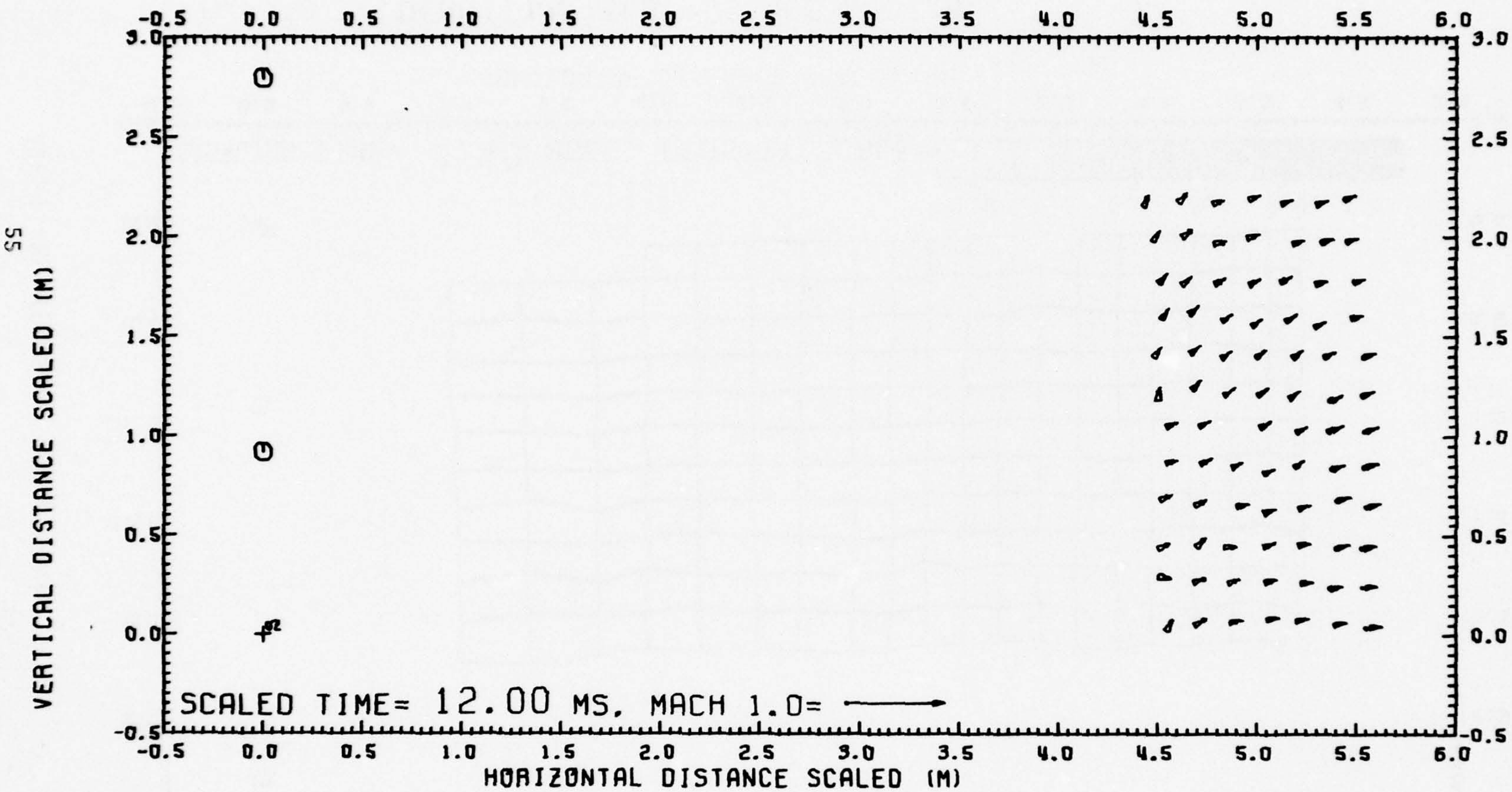


Fig. 12.9 PARTICLE VELOCITY FIELD, DIPOLE WEST/8

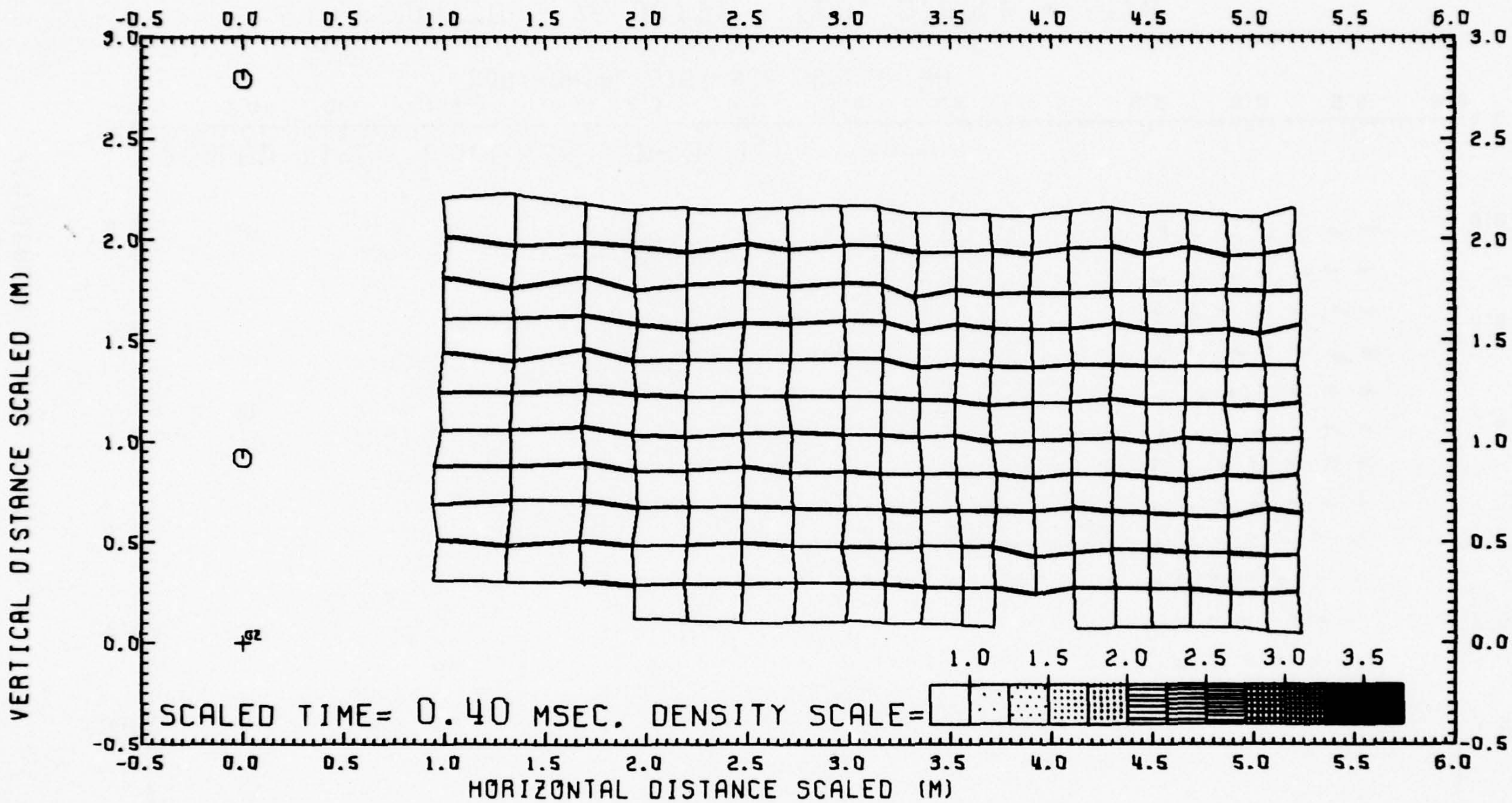


Fig. 13.1 DENSITY FIELD, DIPOLE WEST/8

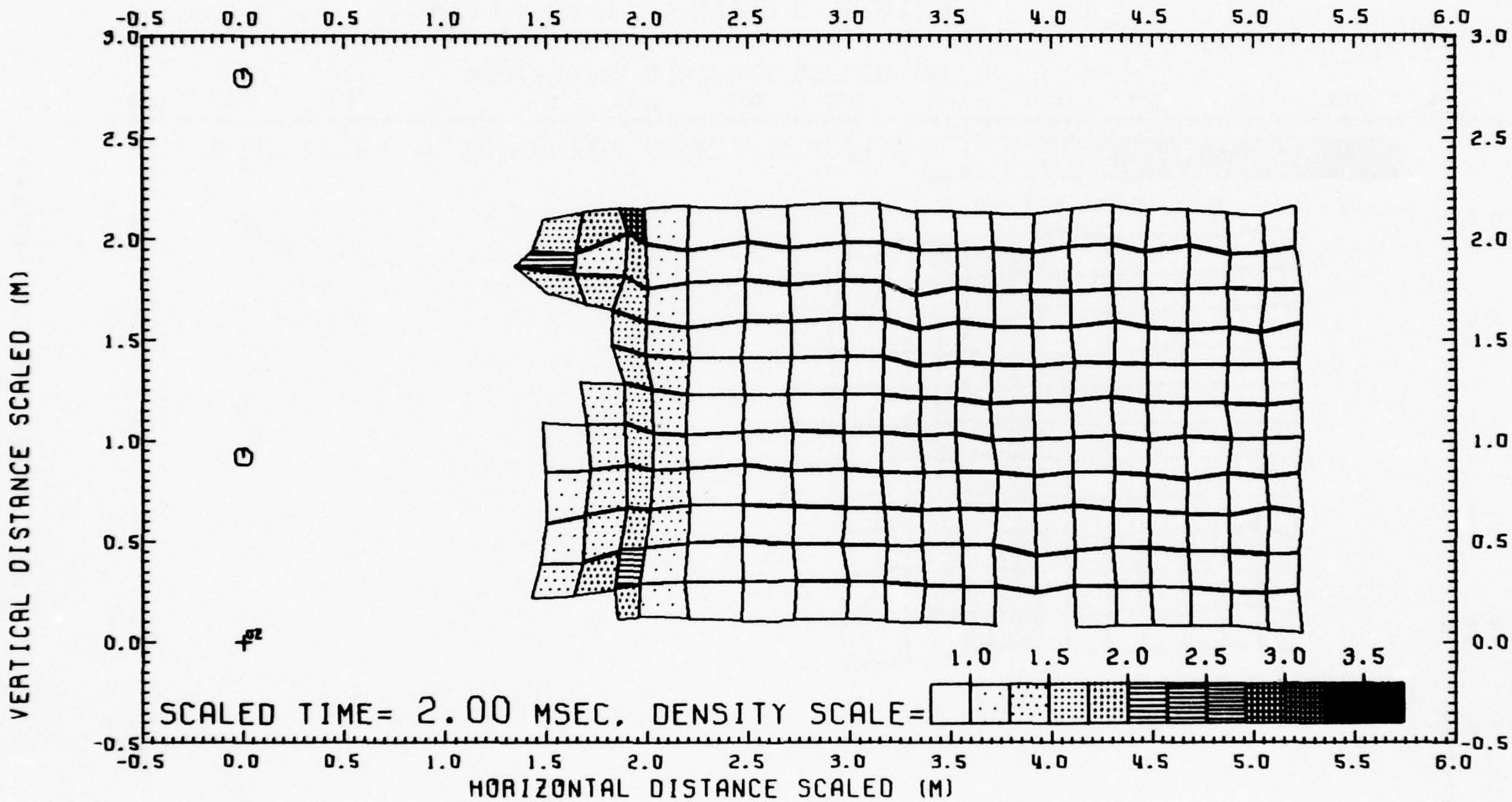


Fig. 13.2 DENSITY FIELD, DIPOLE WEST/8

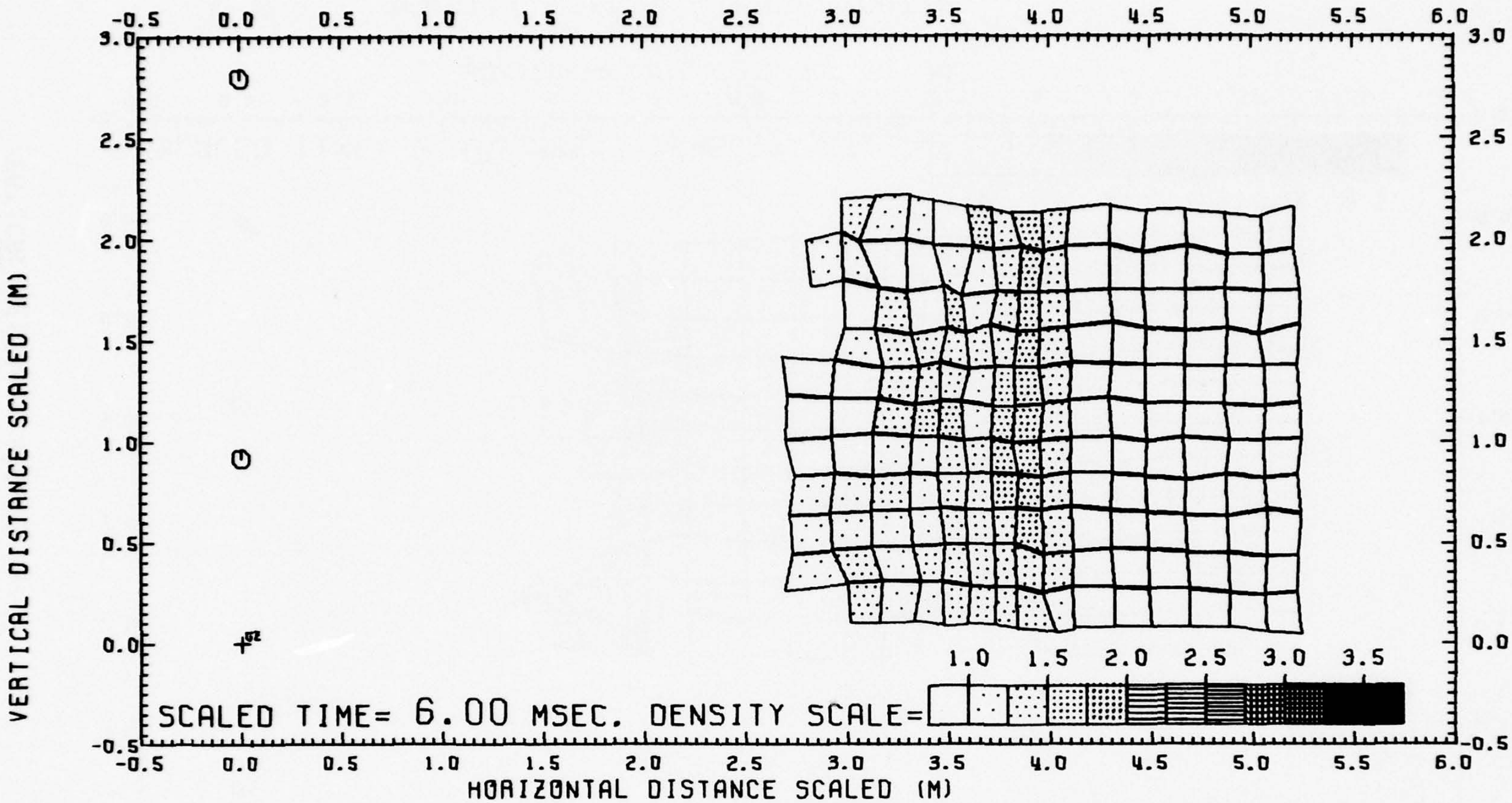


Fig. 13.3 DENSITY FIELD, DIPOLE WEST/8

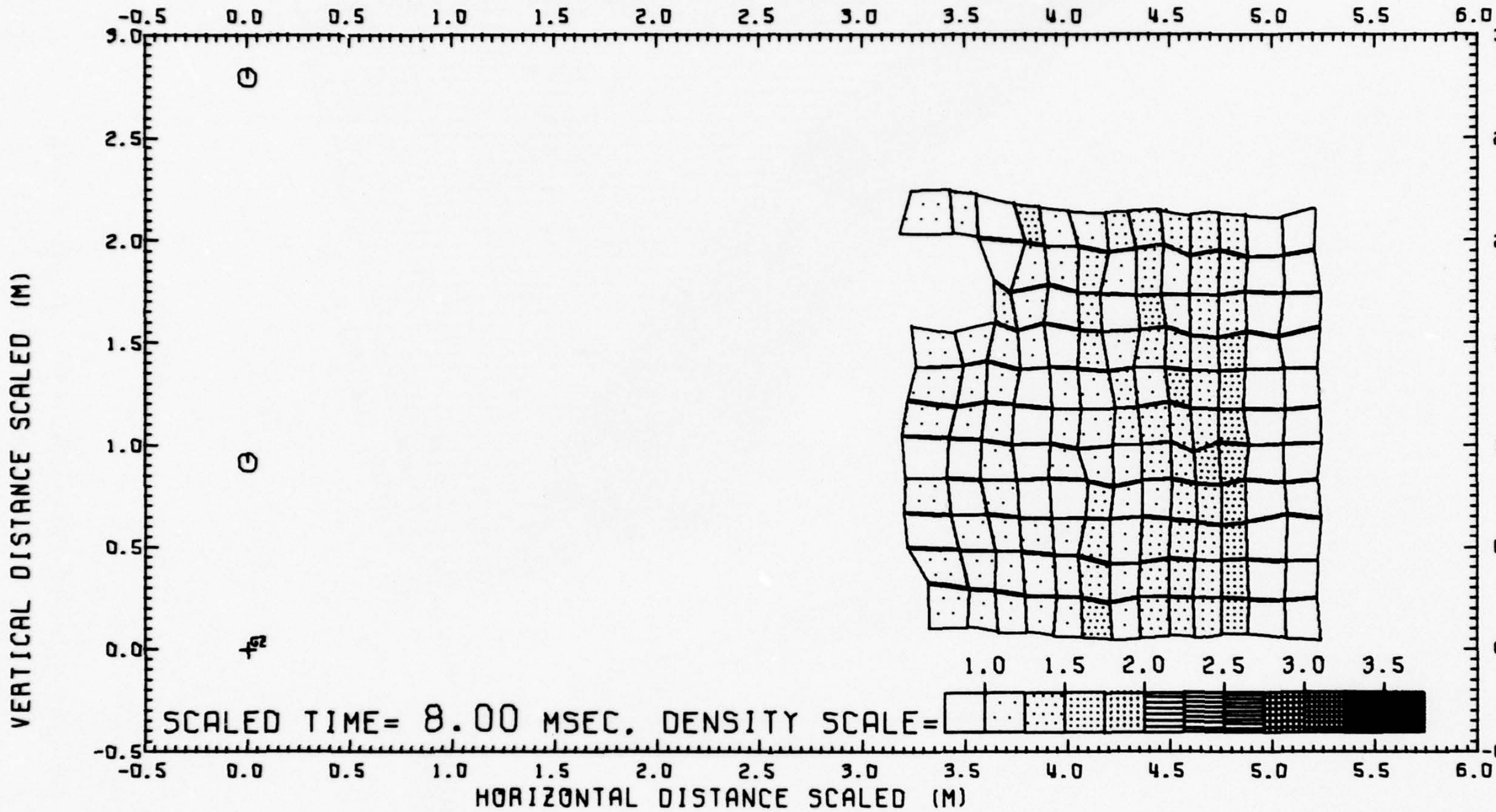


Fig. 13.4 DENSITY FIELD, DIPOLE WEST/8

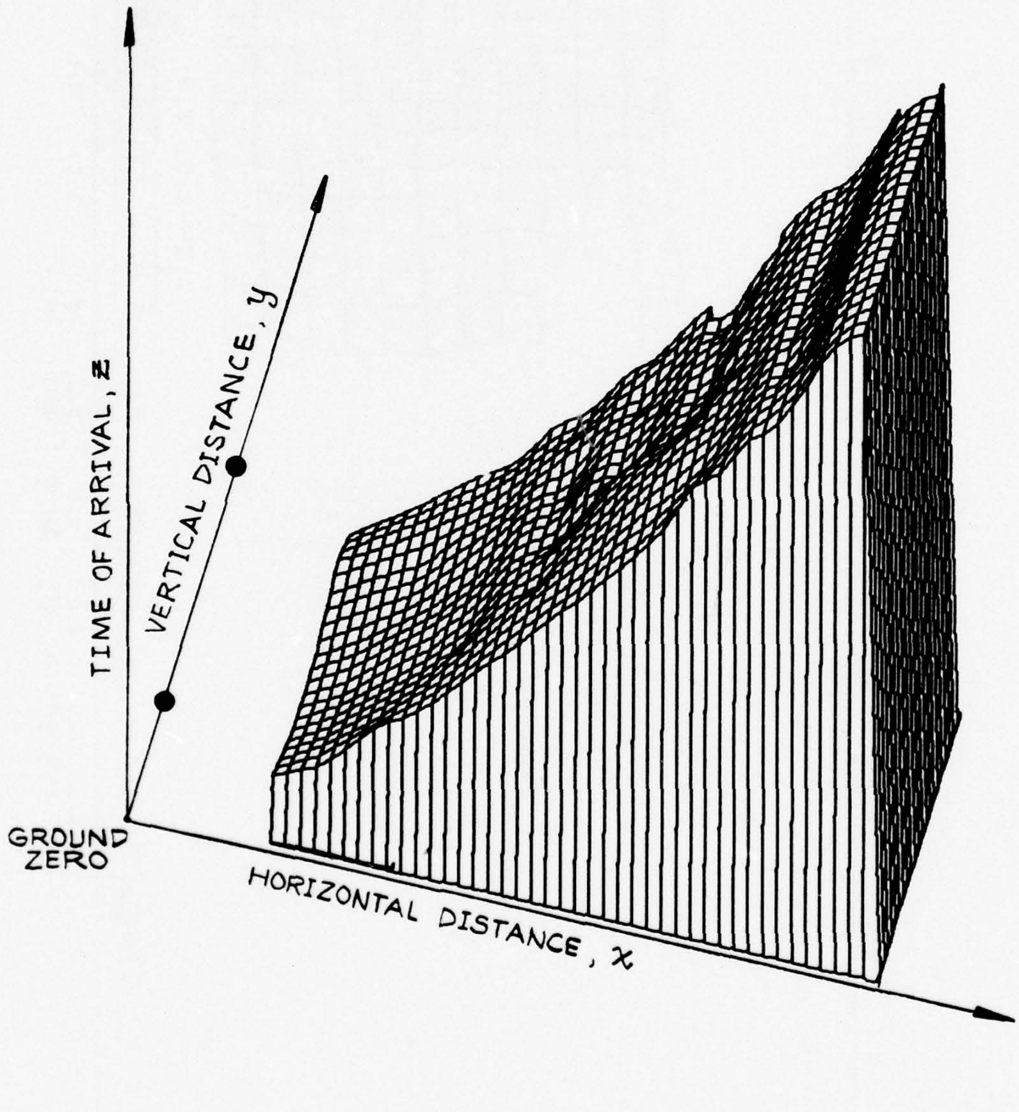


Fig. 14 Time-of-arrival surface, Dipole West/8

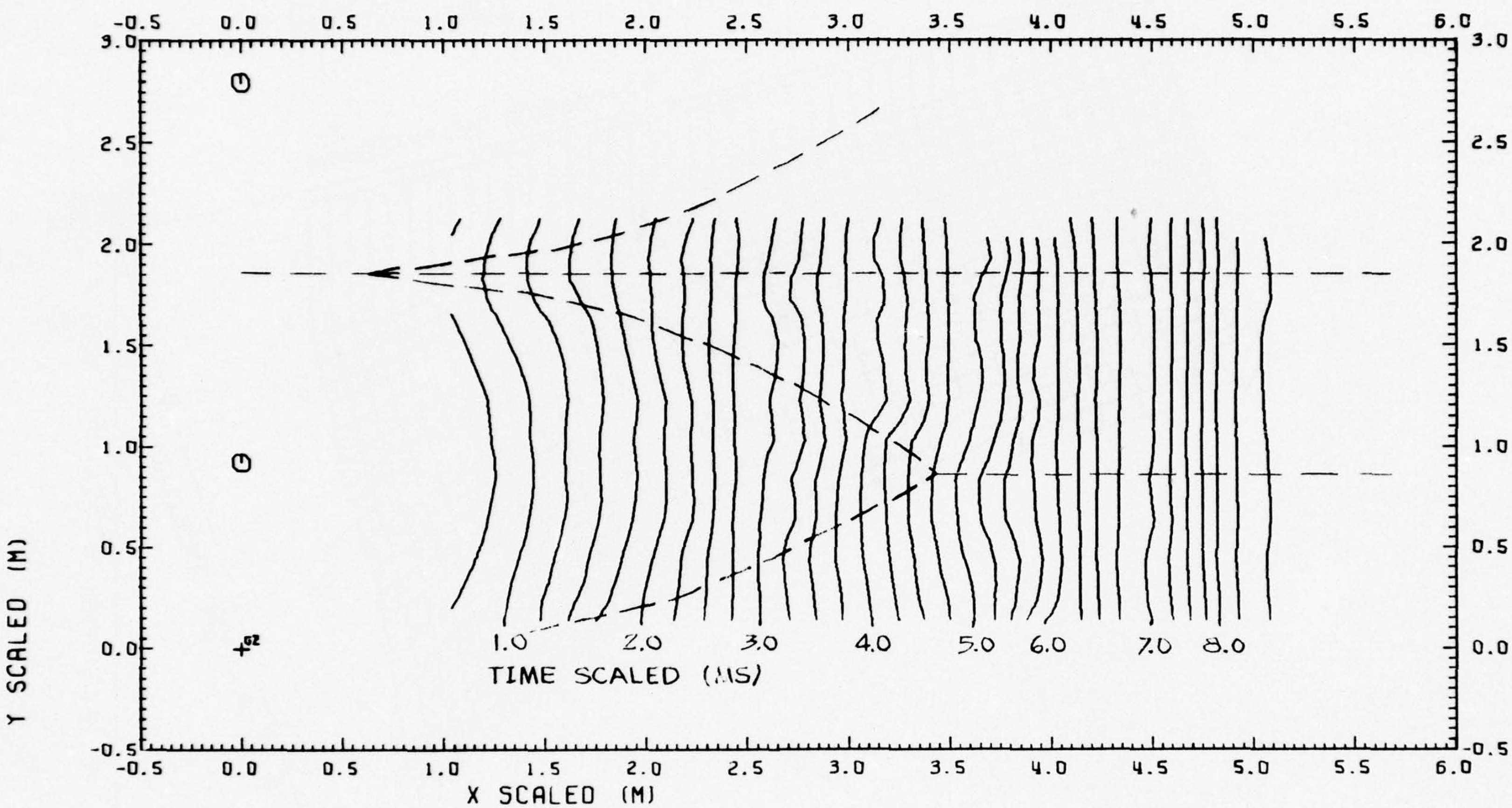


Fig. 15 SHOCK FRONT SHAPES, DIPOLE WEST/8

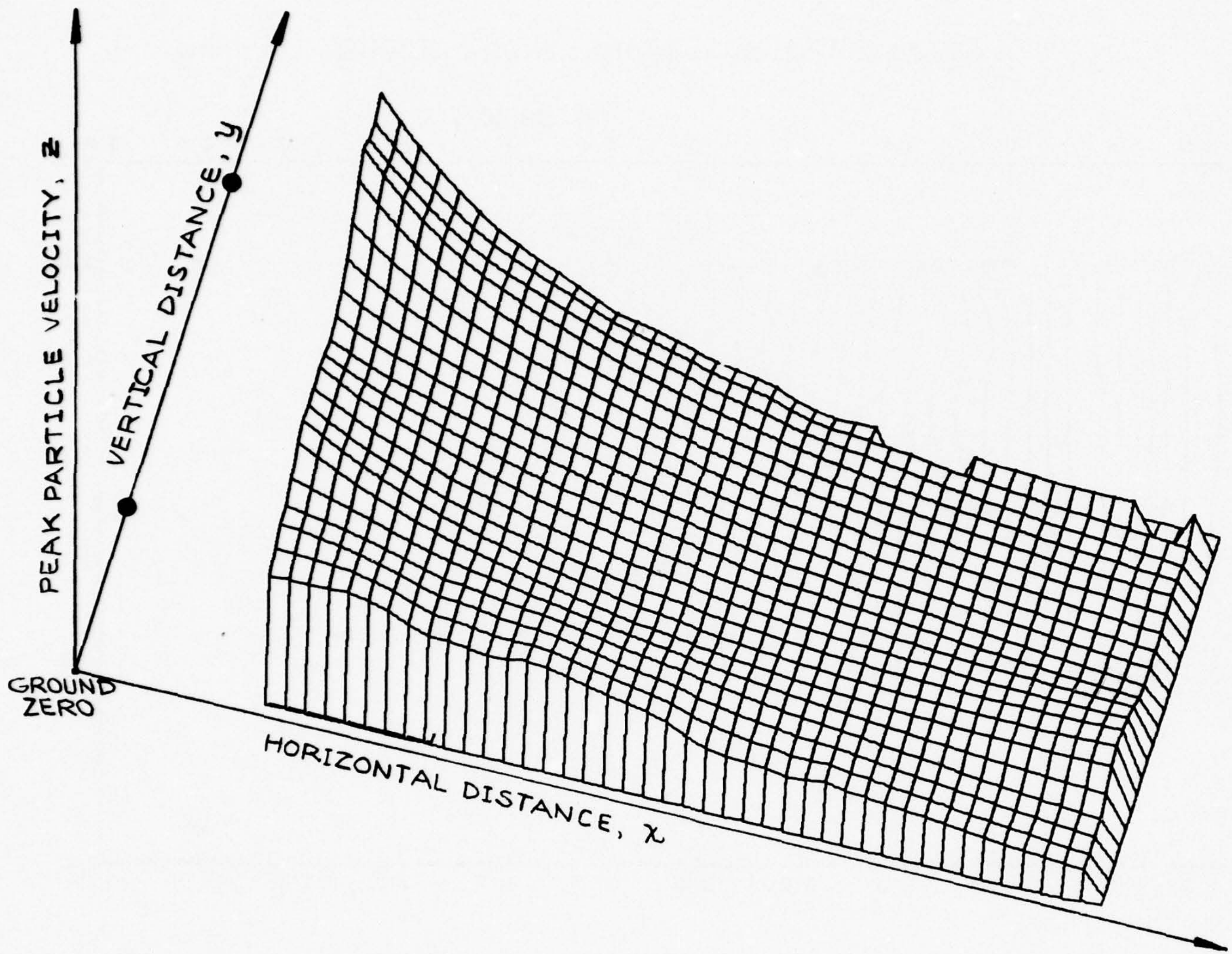


Fig. 16 A shock strength surface, Dipole West/8

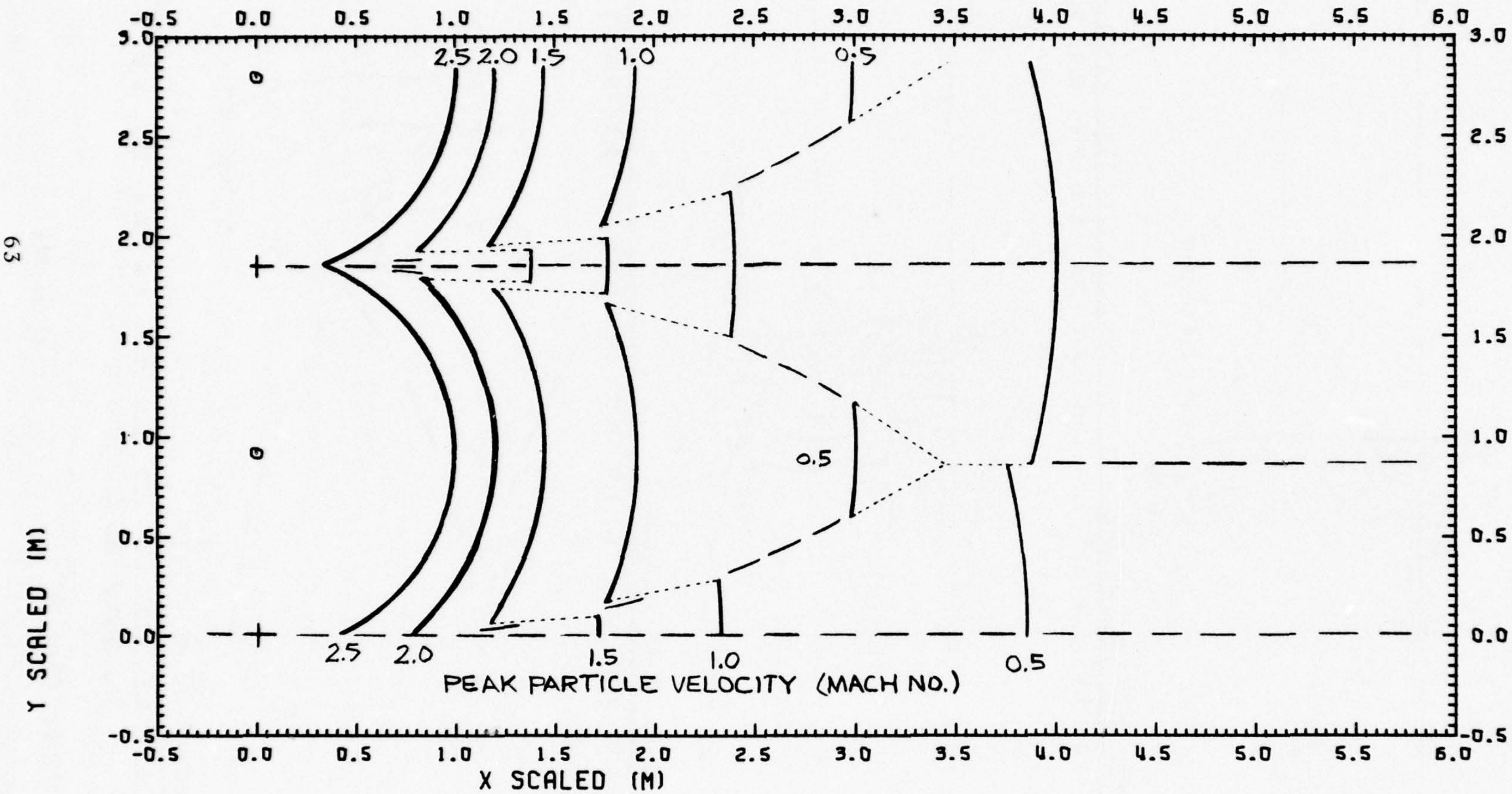


Fig. 17 SHOCK STRENGTH CONTOURS, DIPOLE WEST/8

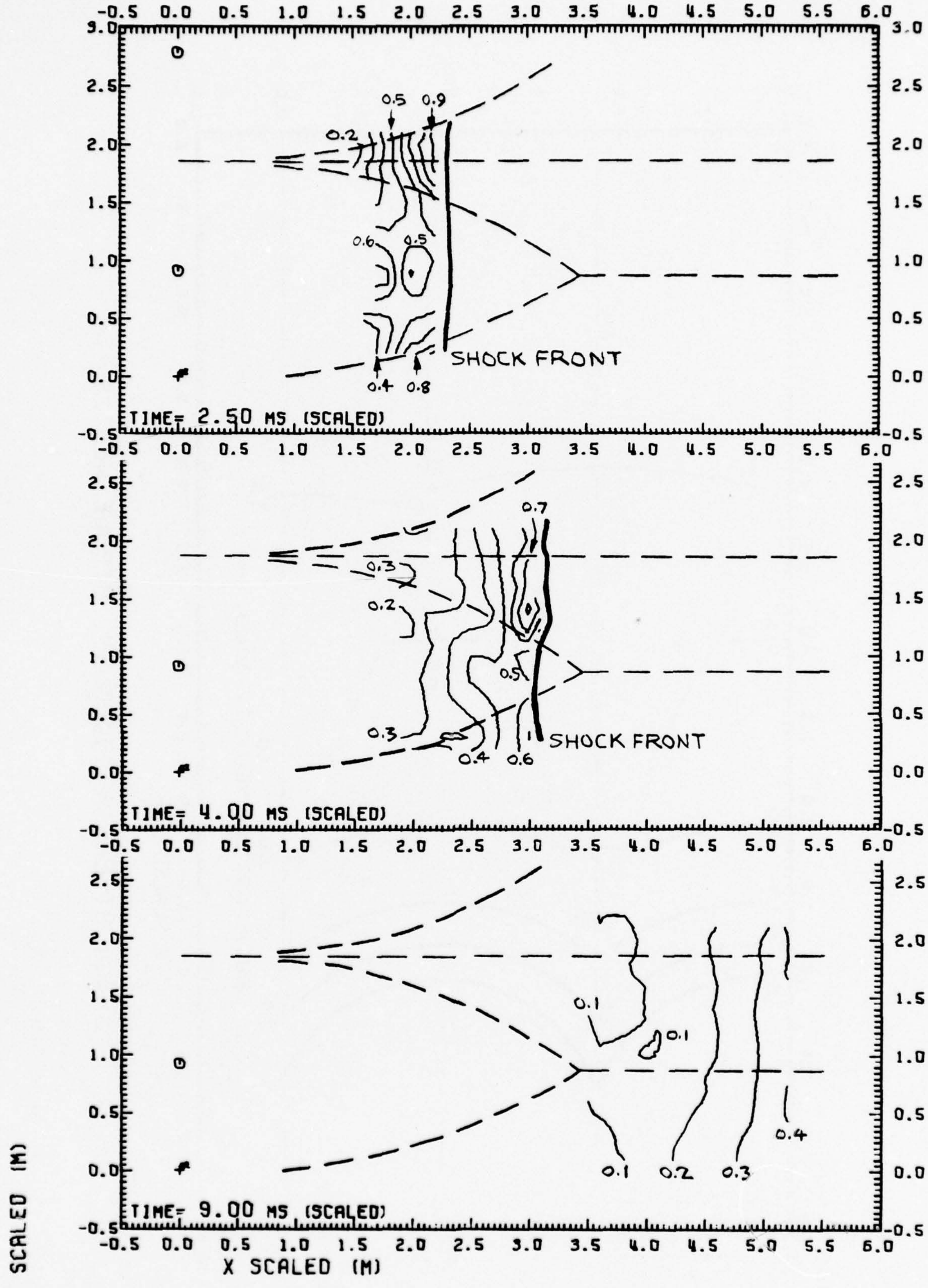


Fig. 18 PARTICLE VELOCITY, DIPOLE WEST/8

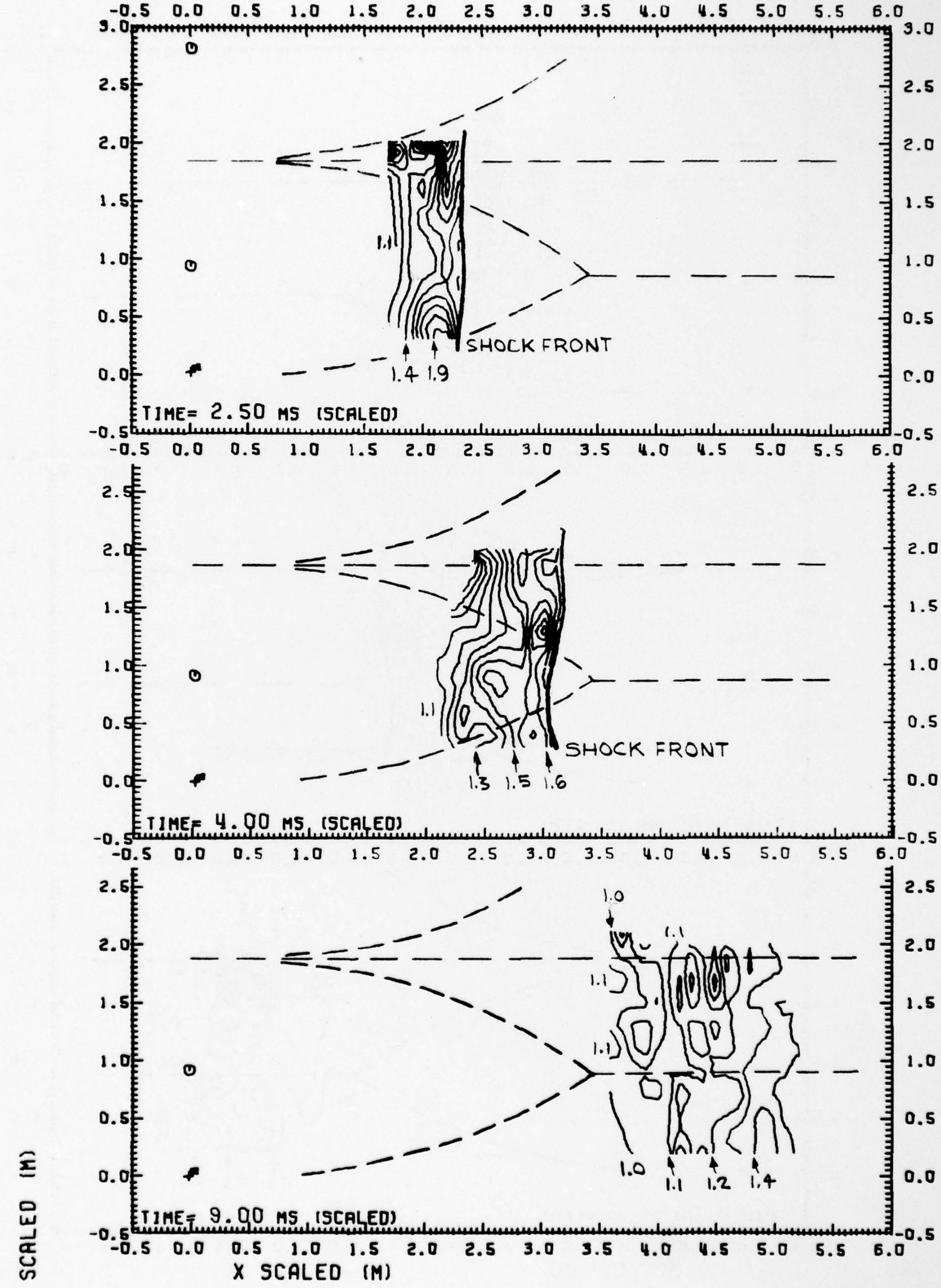


Fig. 19 DENSITY, DIPOLE WEST/8

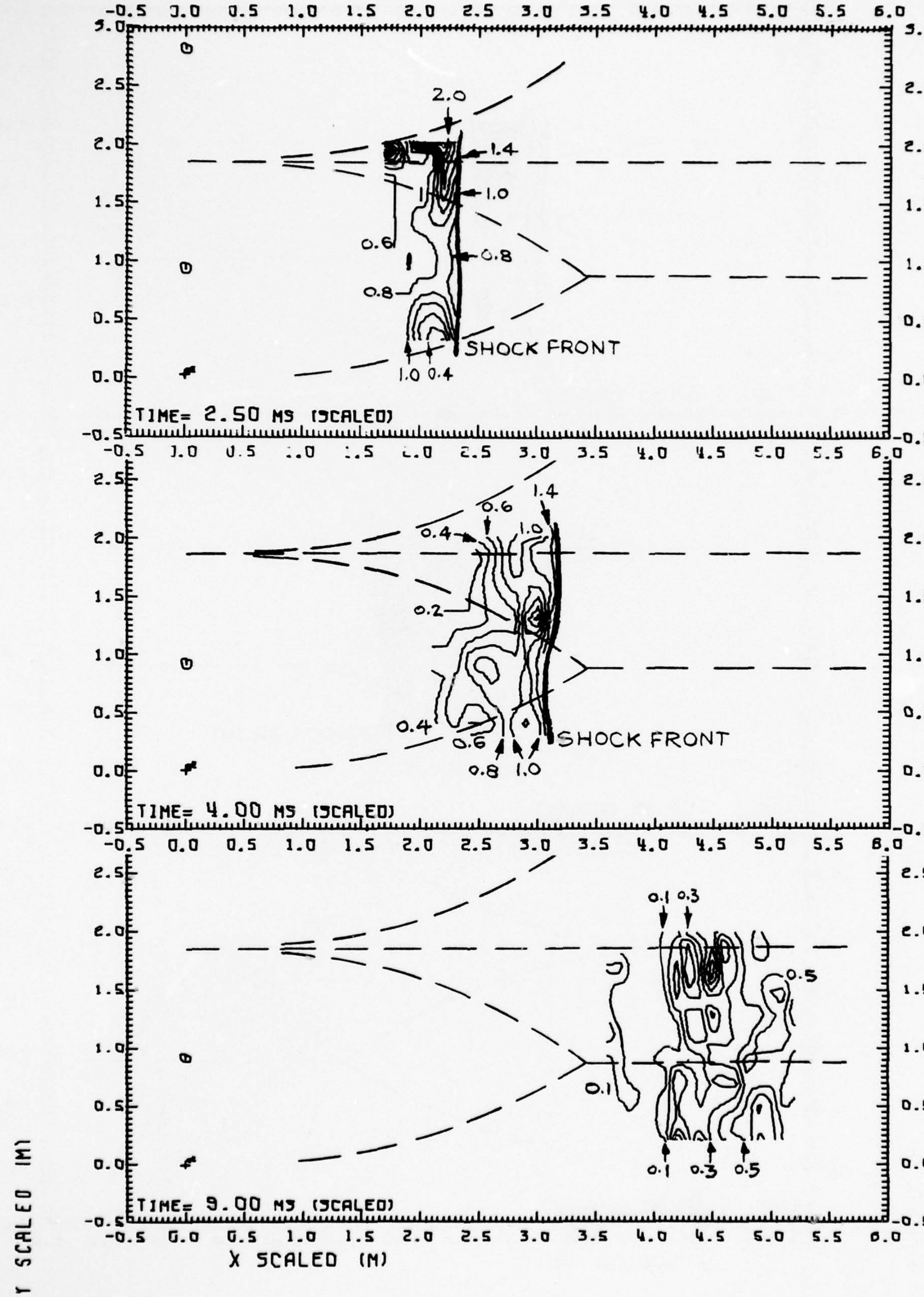


Fig. 20 HYDROSTATIC OVERPRESSURE, DIPOLE WEST/9

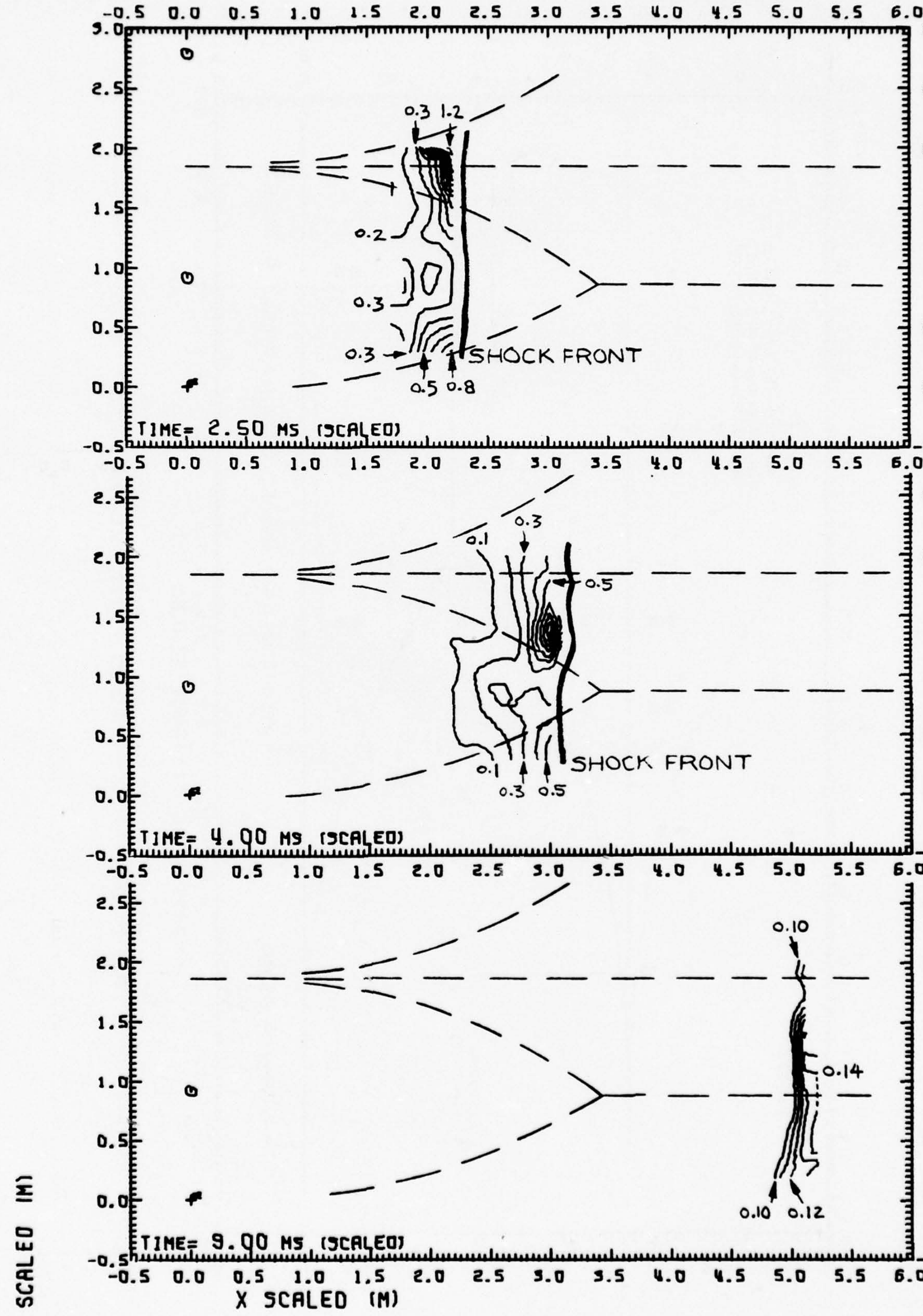


Fig. 21 DYNAMIC PRESSURE, DIPOLE WEST/8

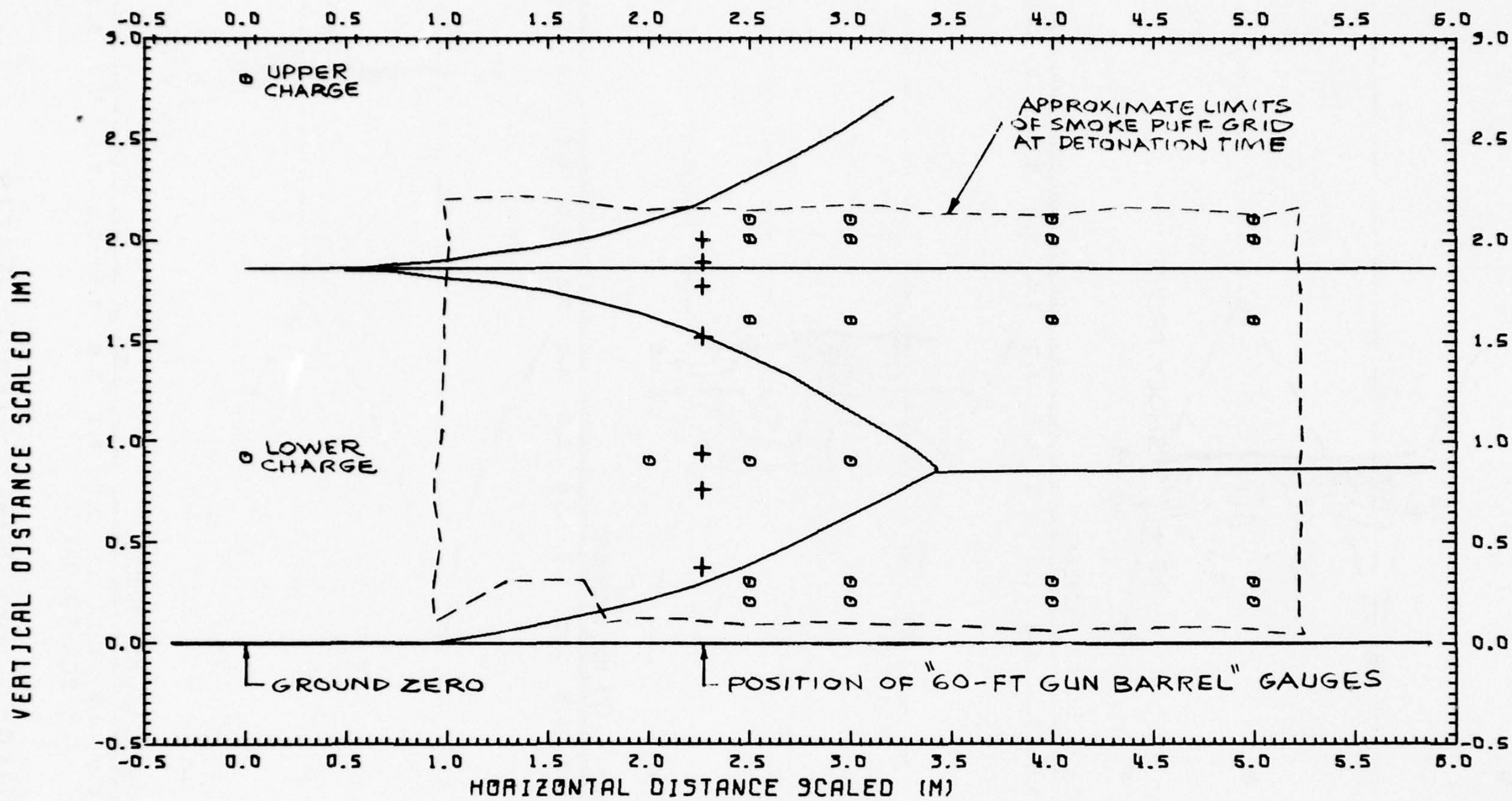


Fig. 22 TIME HISTORY STATIONS, DIPOLE WEST/8

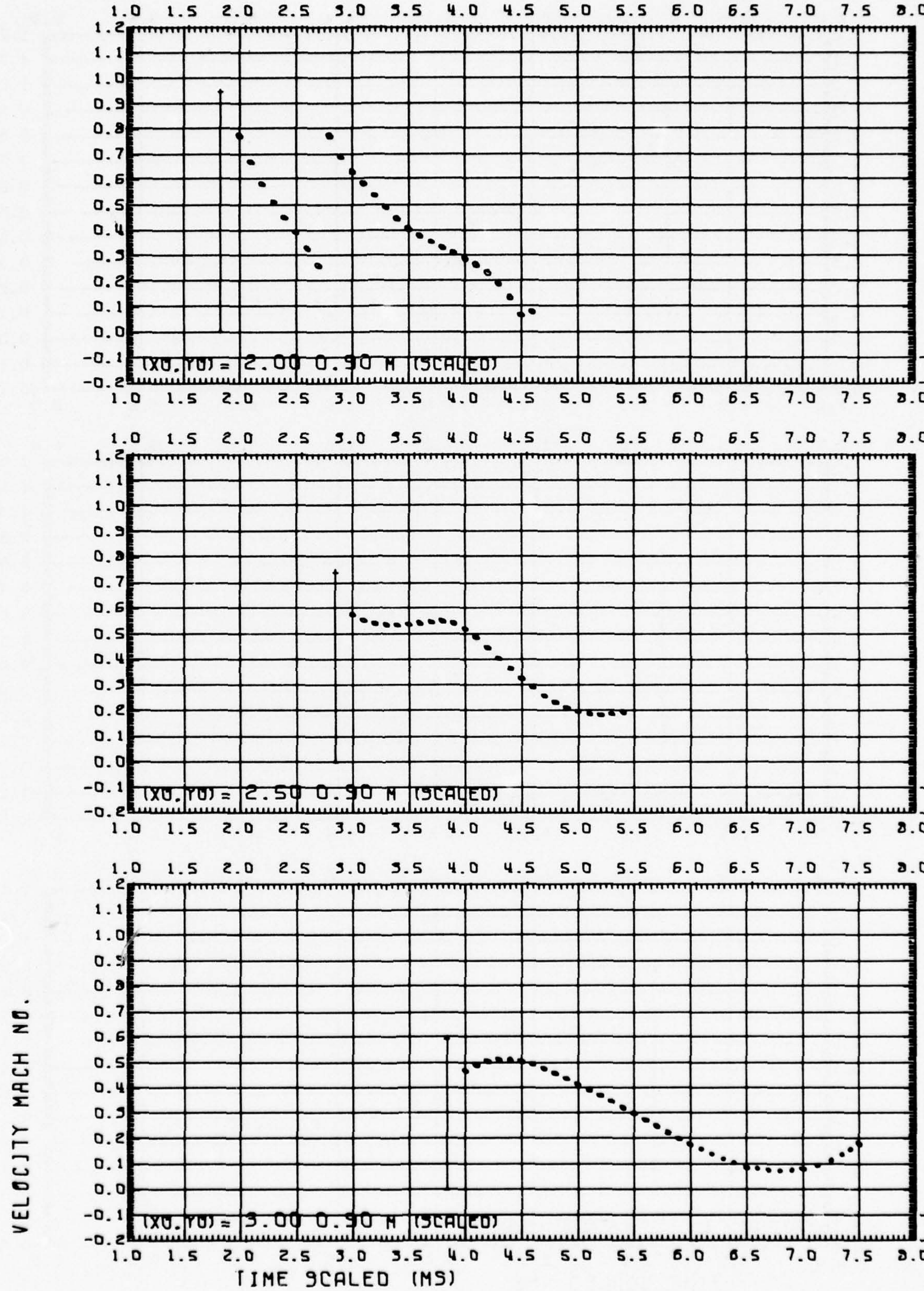


Fig. 23.1 PARTICLE VELOCITY, DIPOLE WEST/8

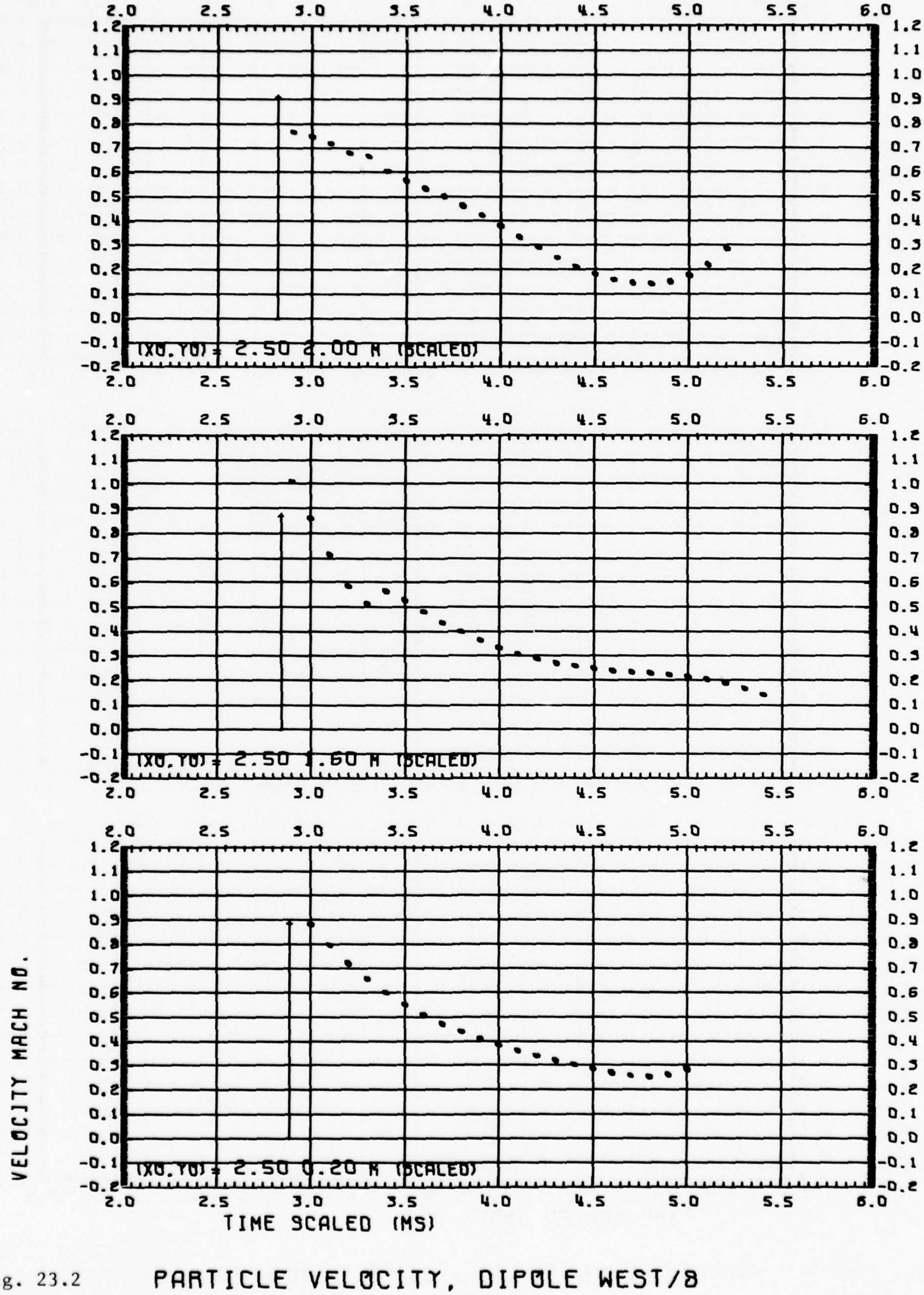


Fig. 23.2 PARTICLE VELOCITY, DIPOLE WEST/8

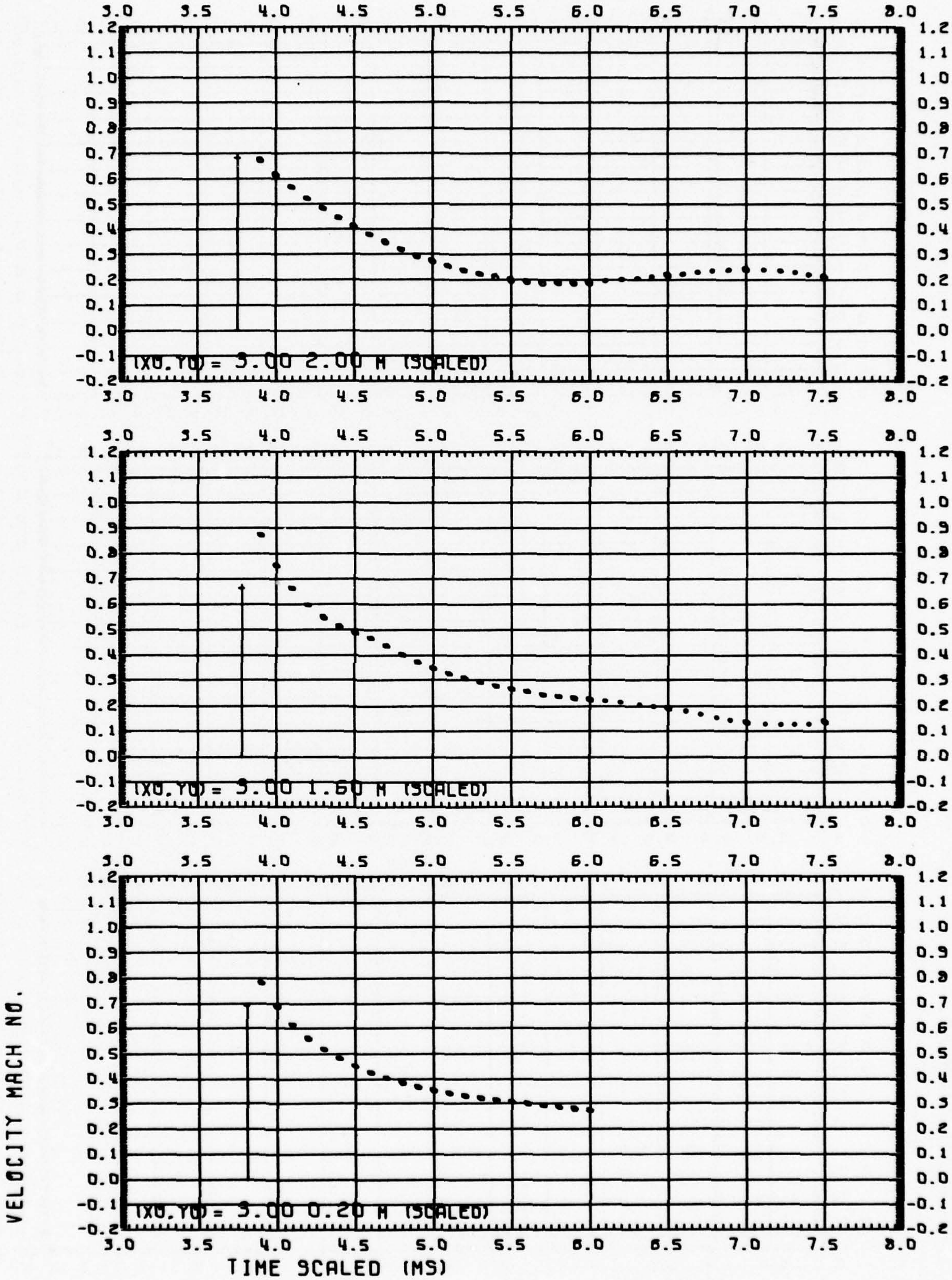


Fig. 23.3 PARTICLE VELOCITY, DIPOLE WEST/8

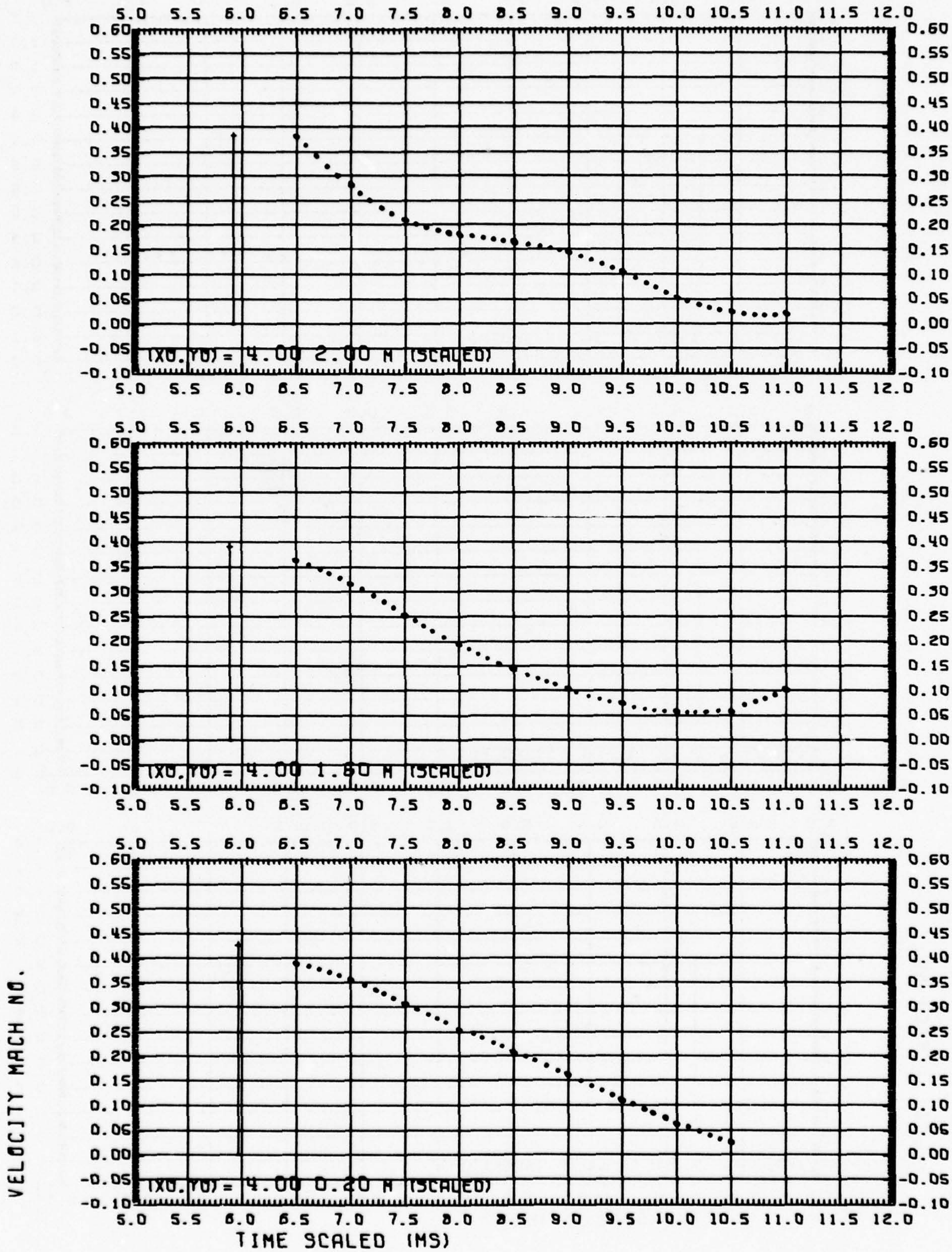


Fig. 23.4 PARTICLE VELOCITY, DIPOLE WEST/8

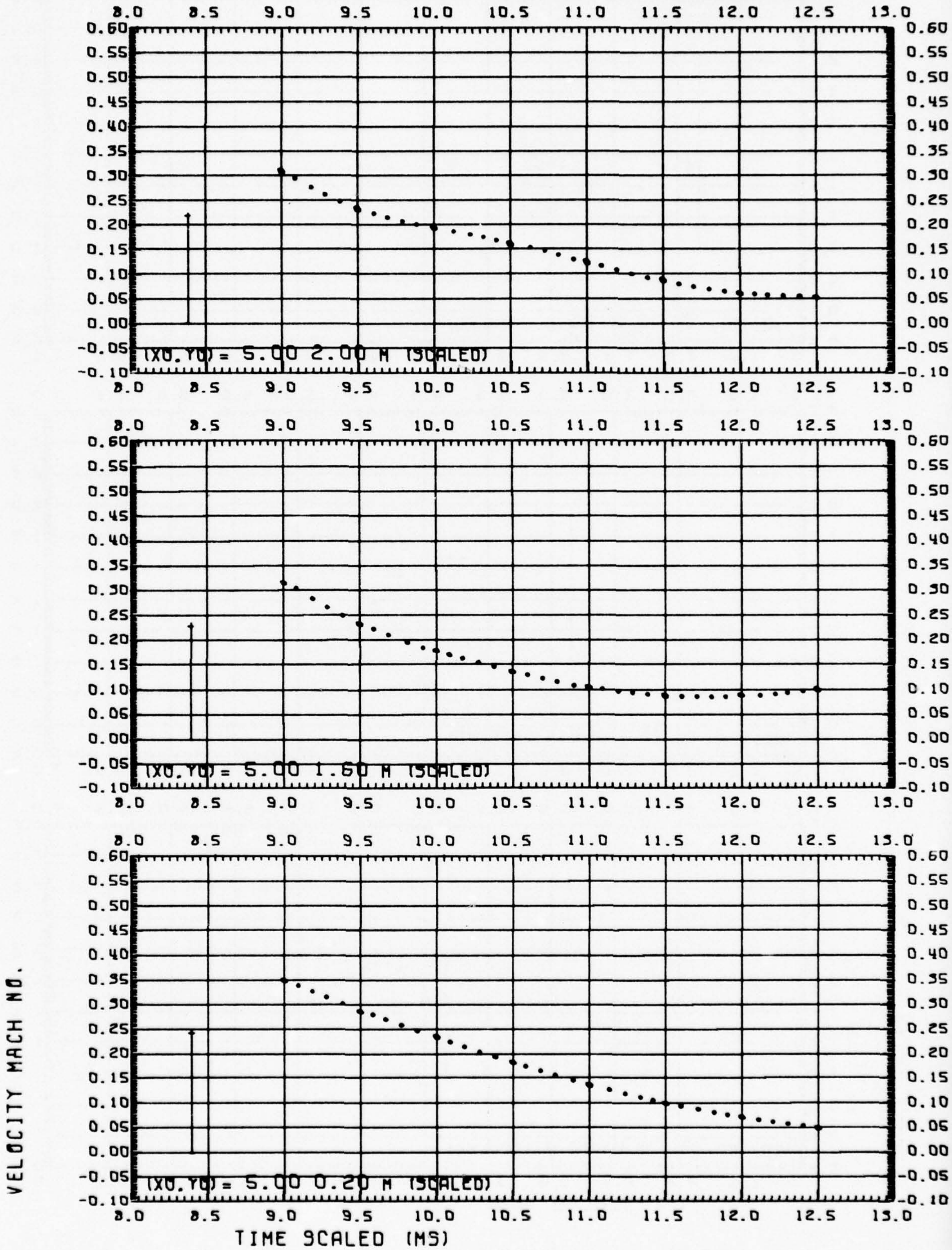


Fig. 23.5 PARTICLE VELOCITY, DIPOLE WEST/8

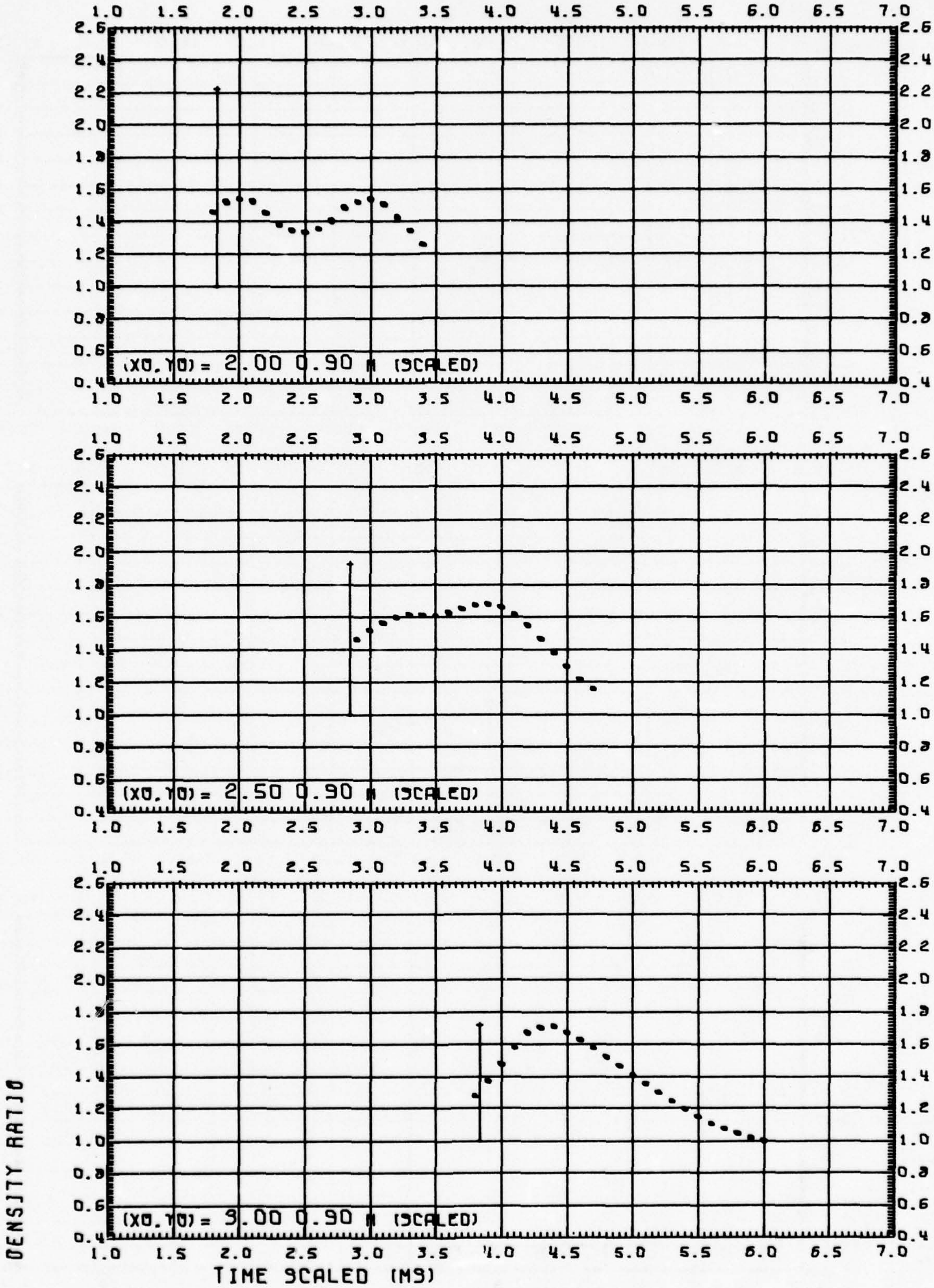


Fig. 24.1 DENSITY, DIPOLE WEST/8

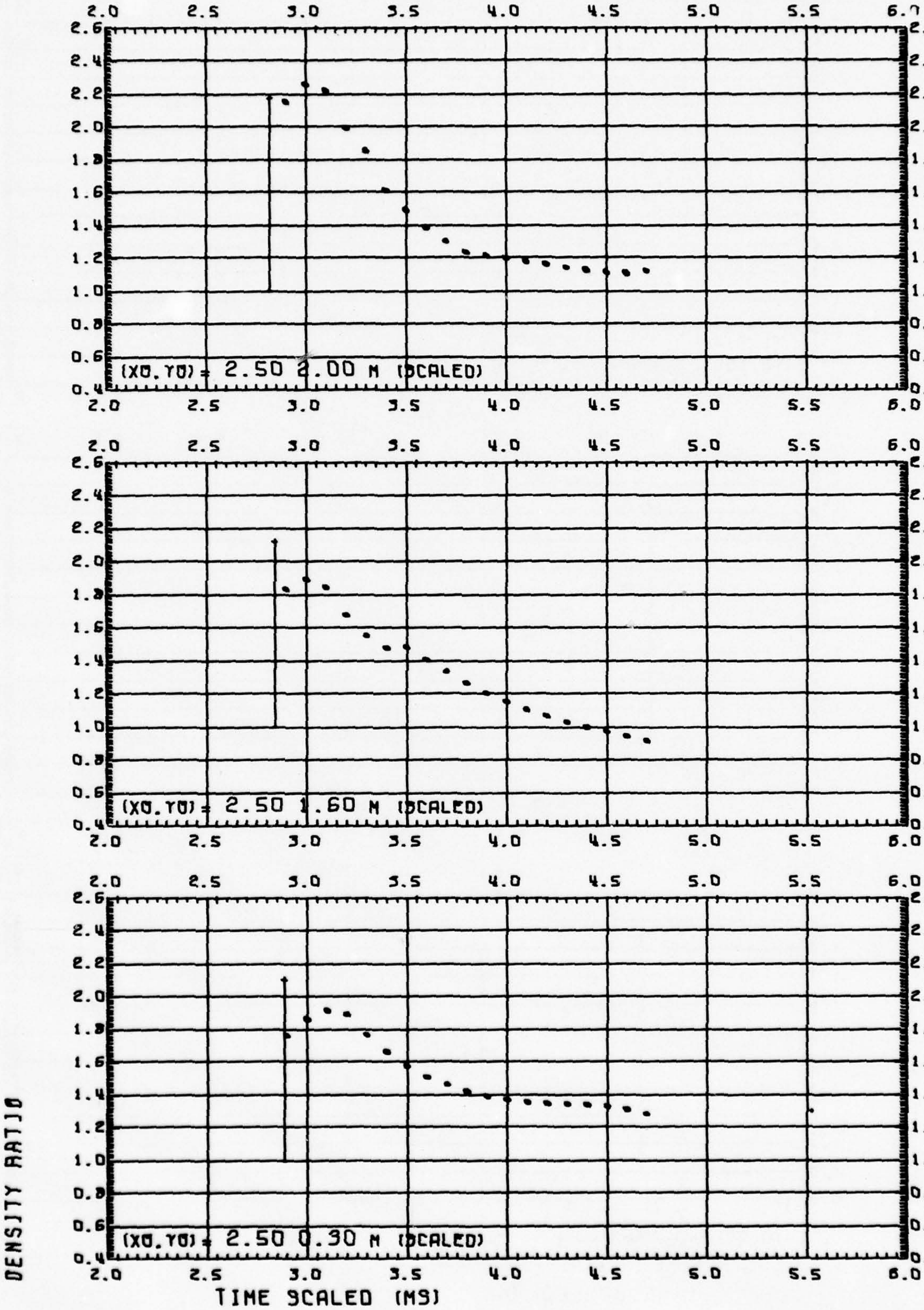


Fig. 24.2 DENSITY, DIPOLE WEST/8

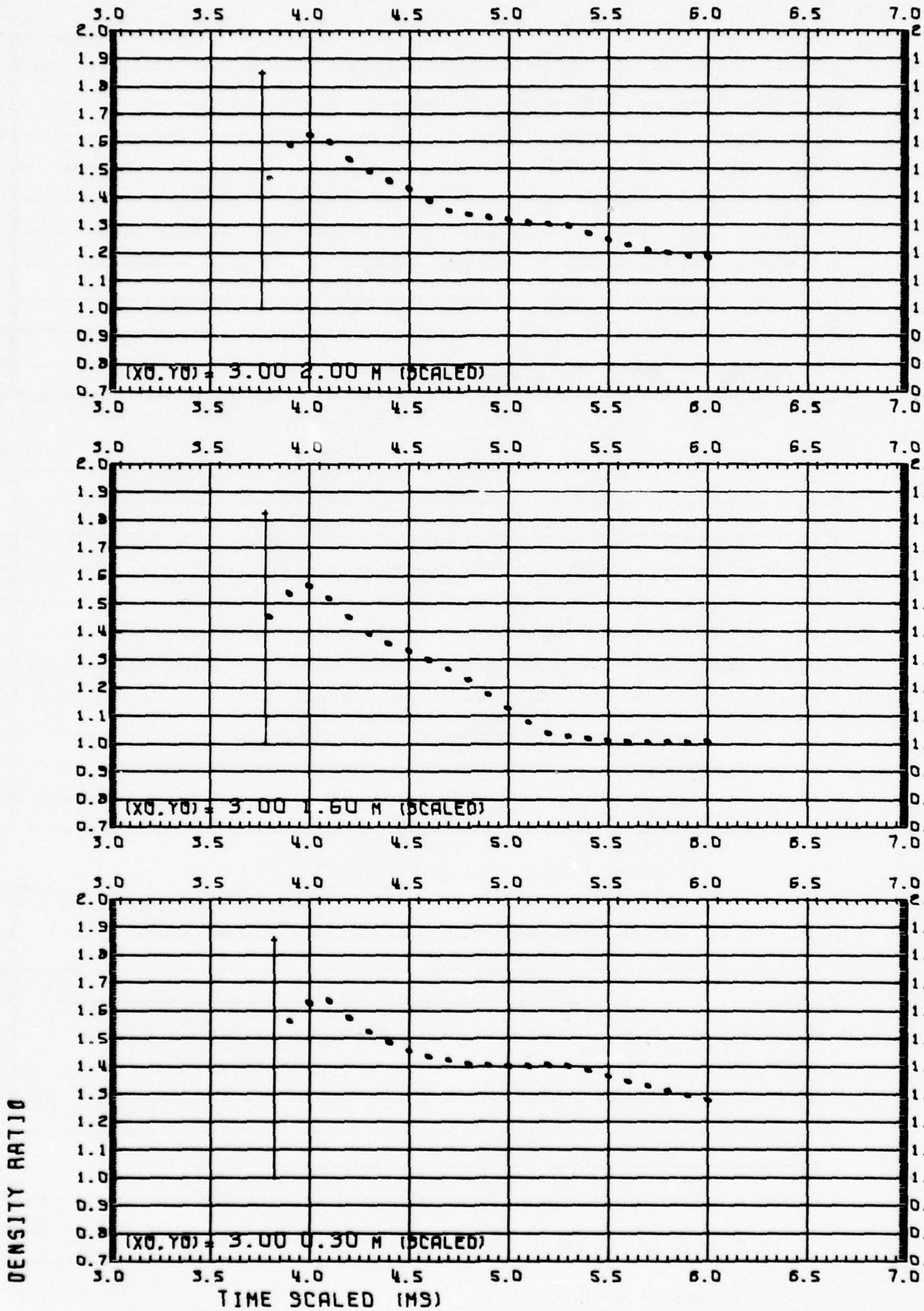
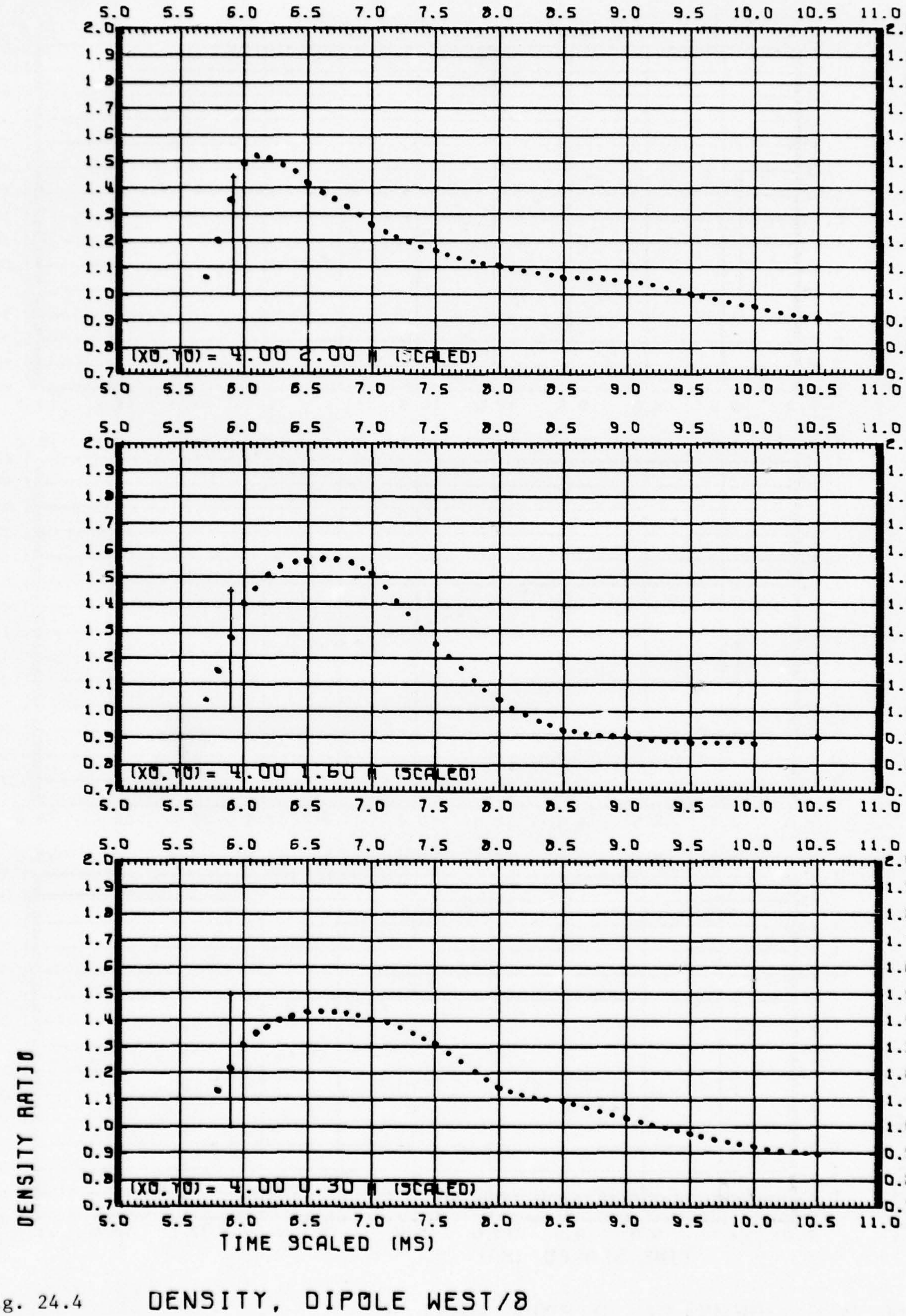


Fig. 24.3 DENSITY, DIPOLE WEST/8



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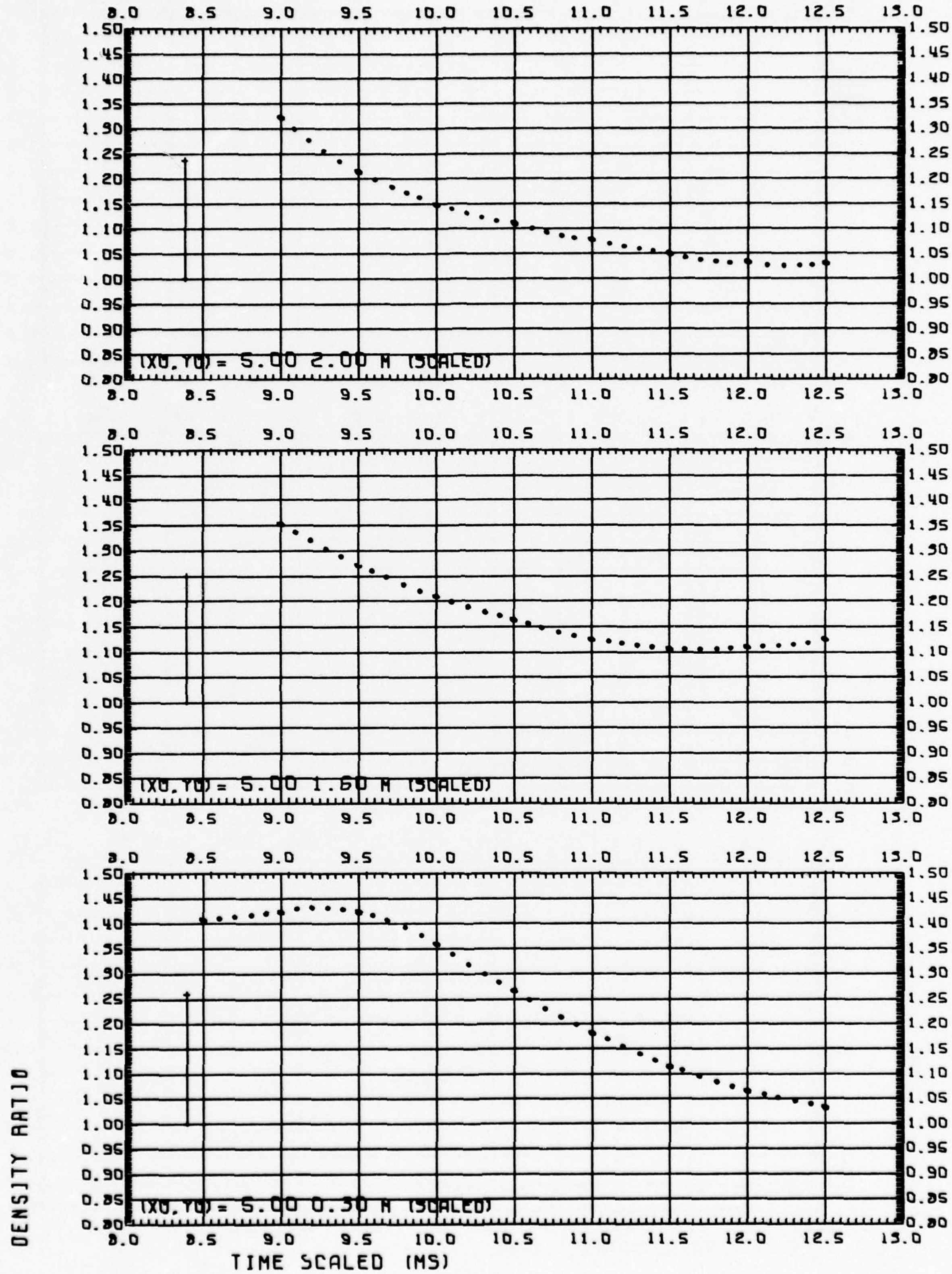

Fig. 24.5 DENSITY, DIPOLE WEST/8

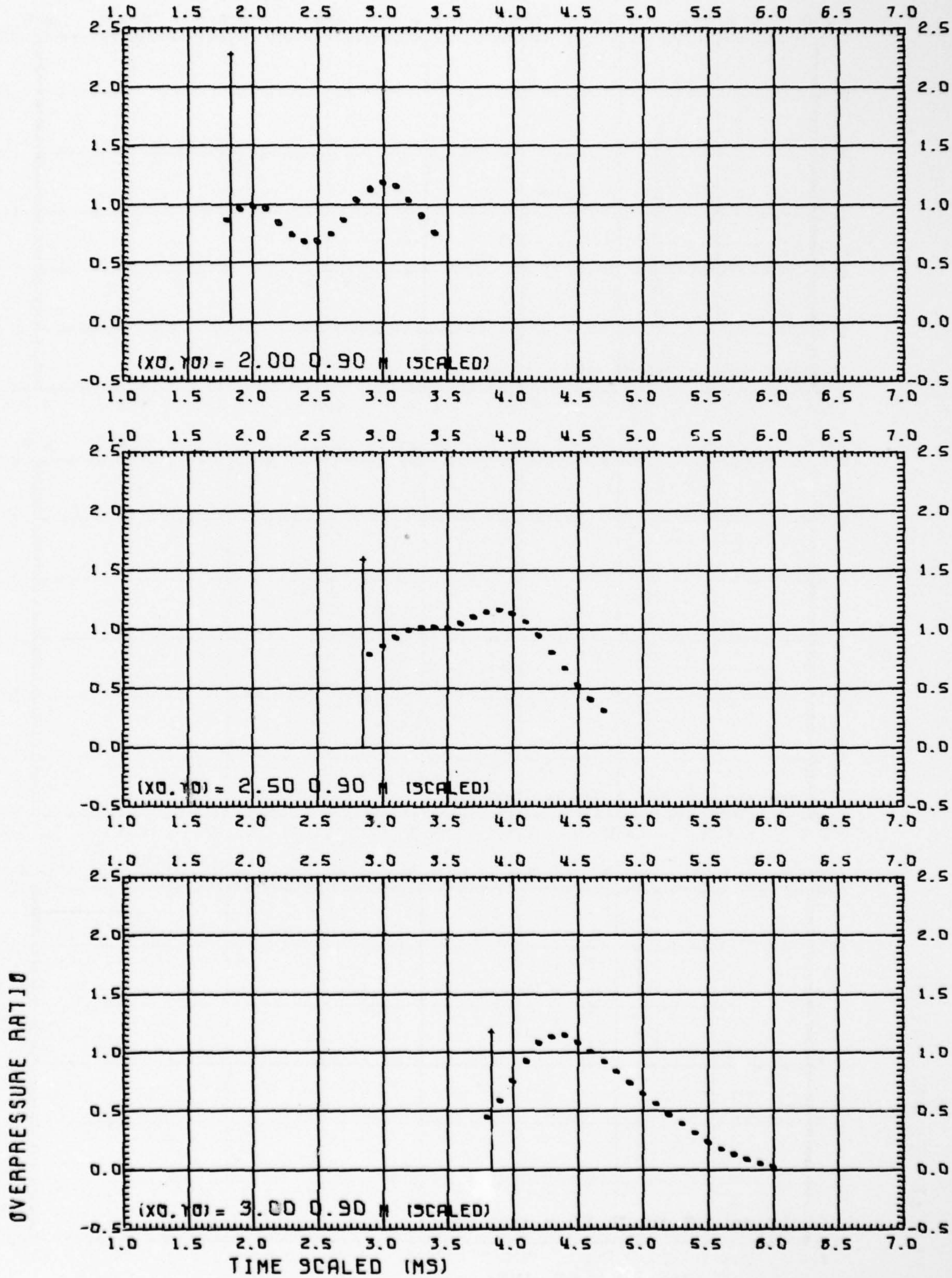

Fig. 25.1 HYDROSTATIC OVERPRESSURE, DIPOLE WEST/8

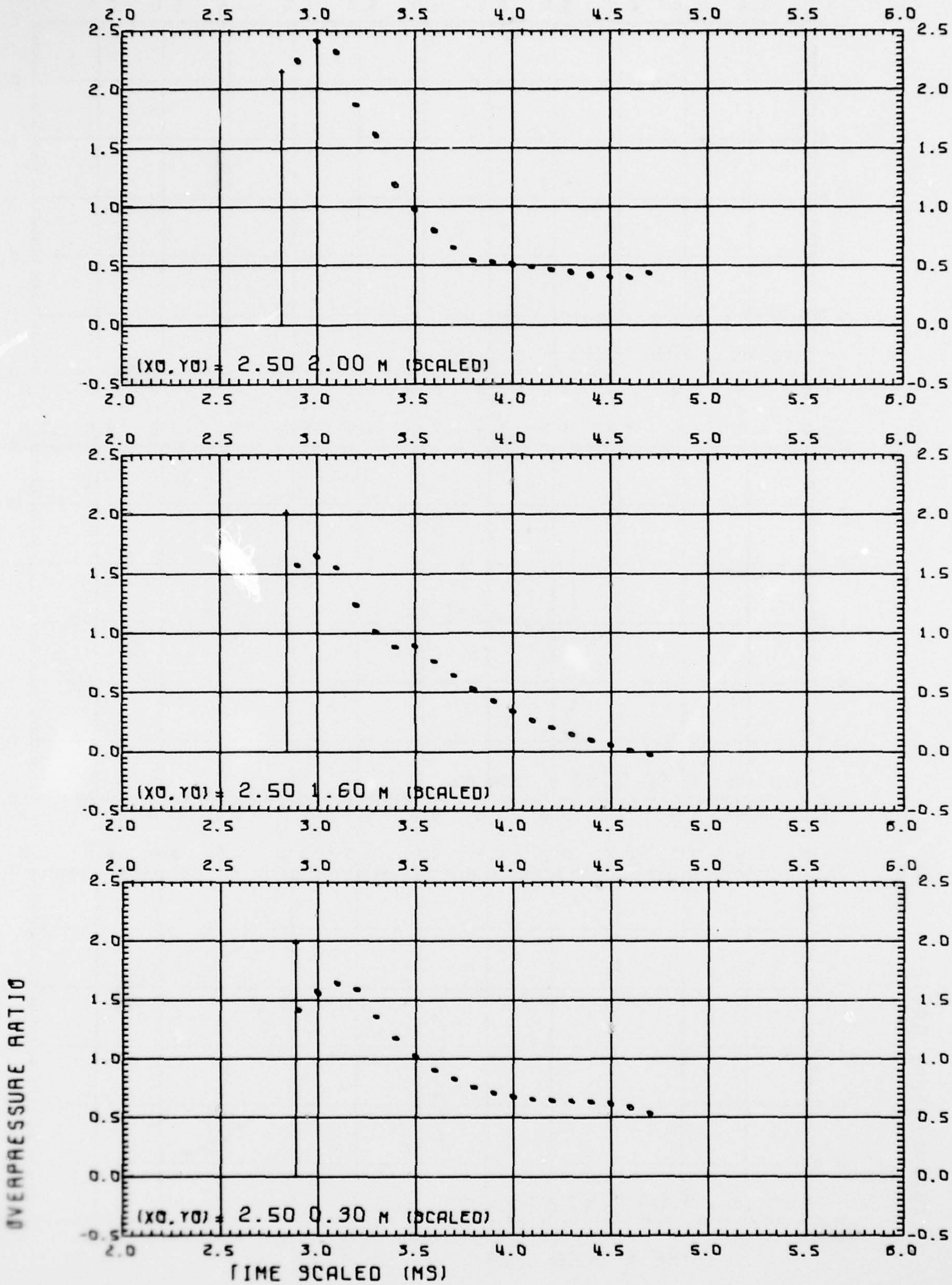

Fig. 25.2 HYDROSTATIC OVERPRESSURE, DIPOLE WEST/8

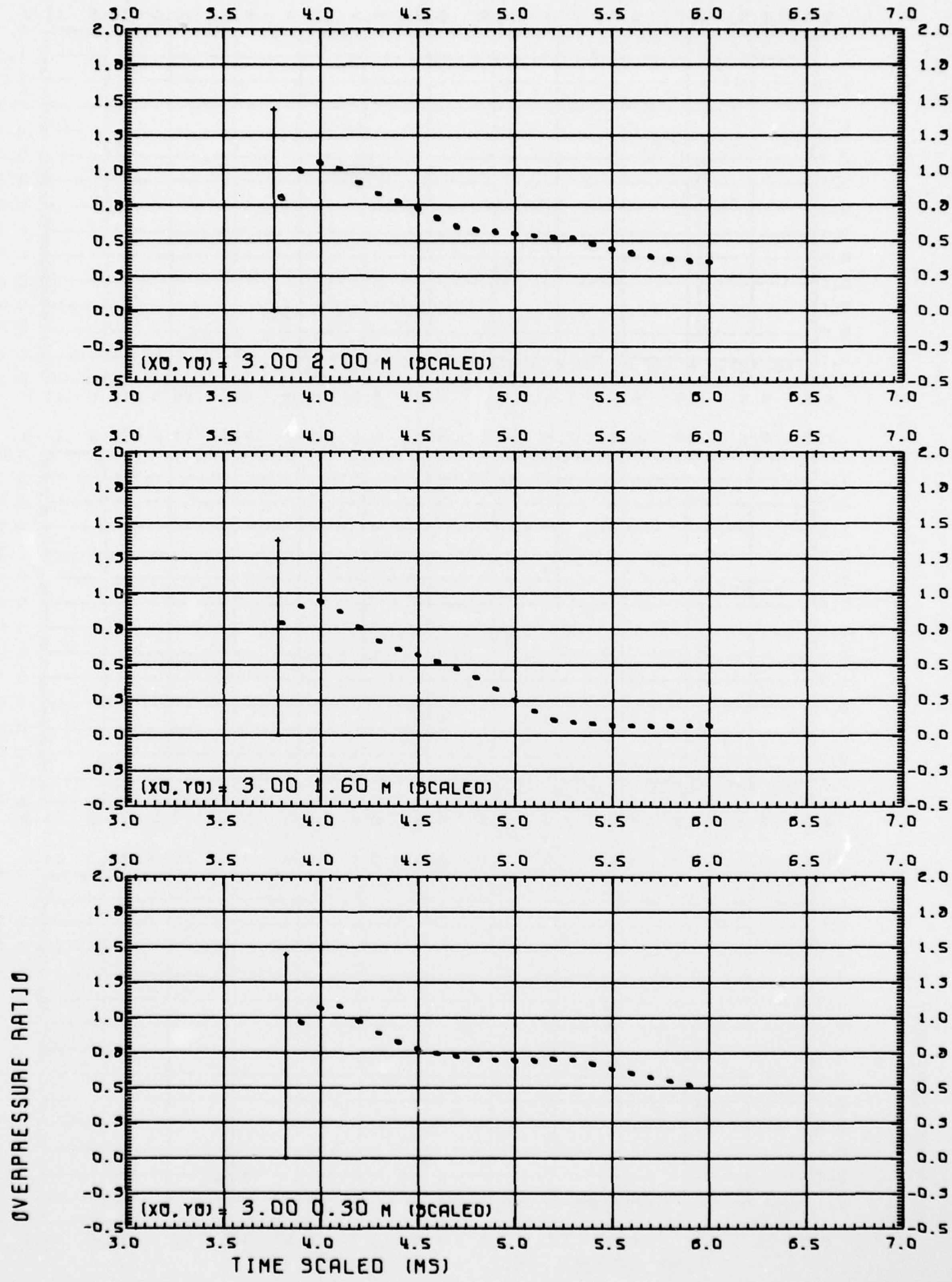

Fig. 25.3 HYDROSTATIC OVERPRESSURE, DIPOLE WEST/8

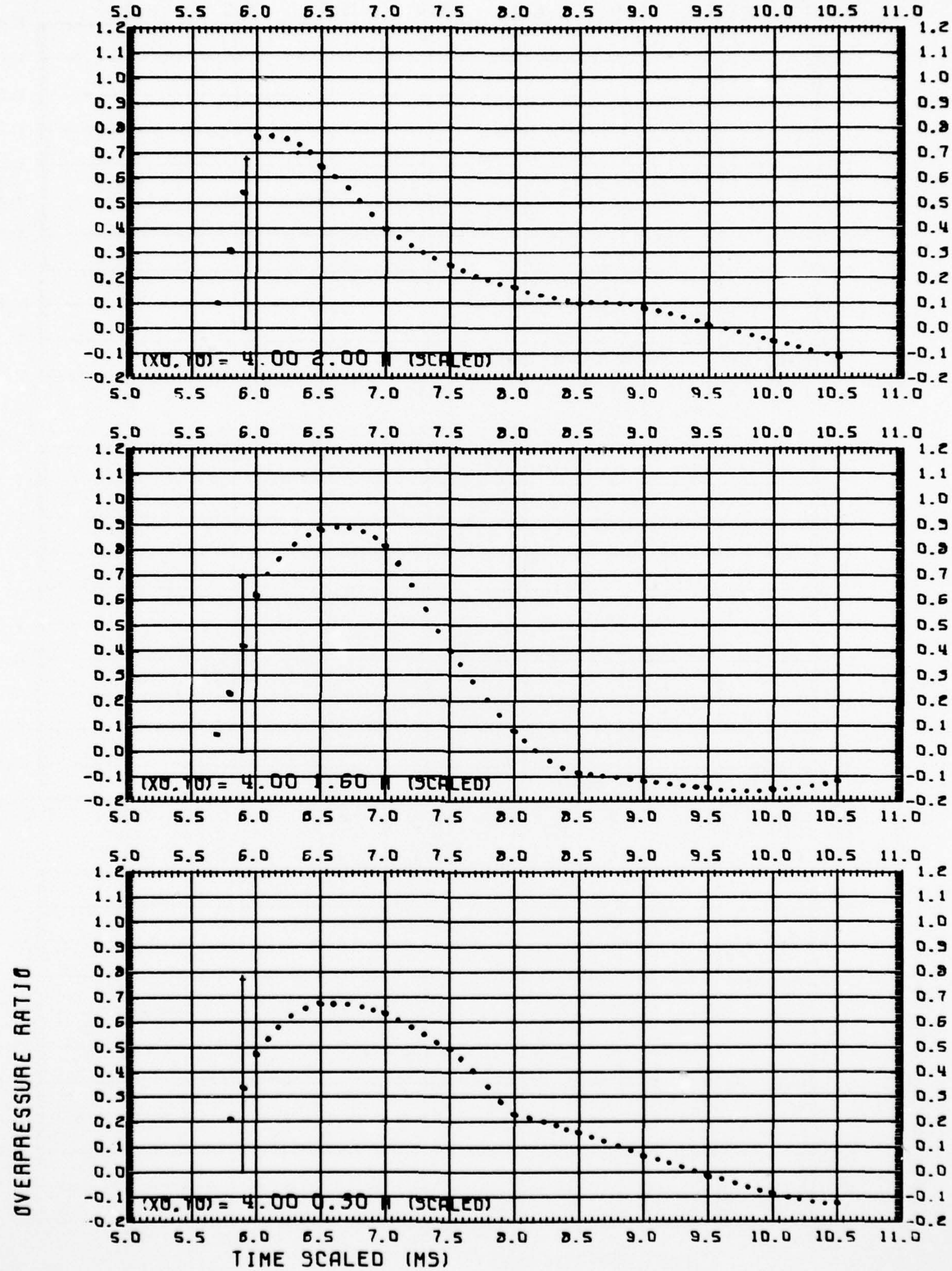

Fig. 25.4 HYDROSTATIC OVERPRESSURE, DIPOLE WEST/8

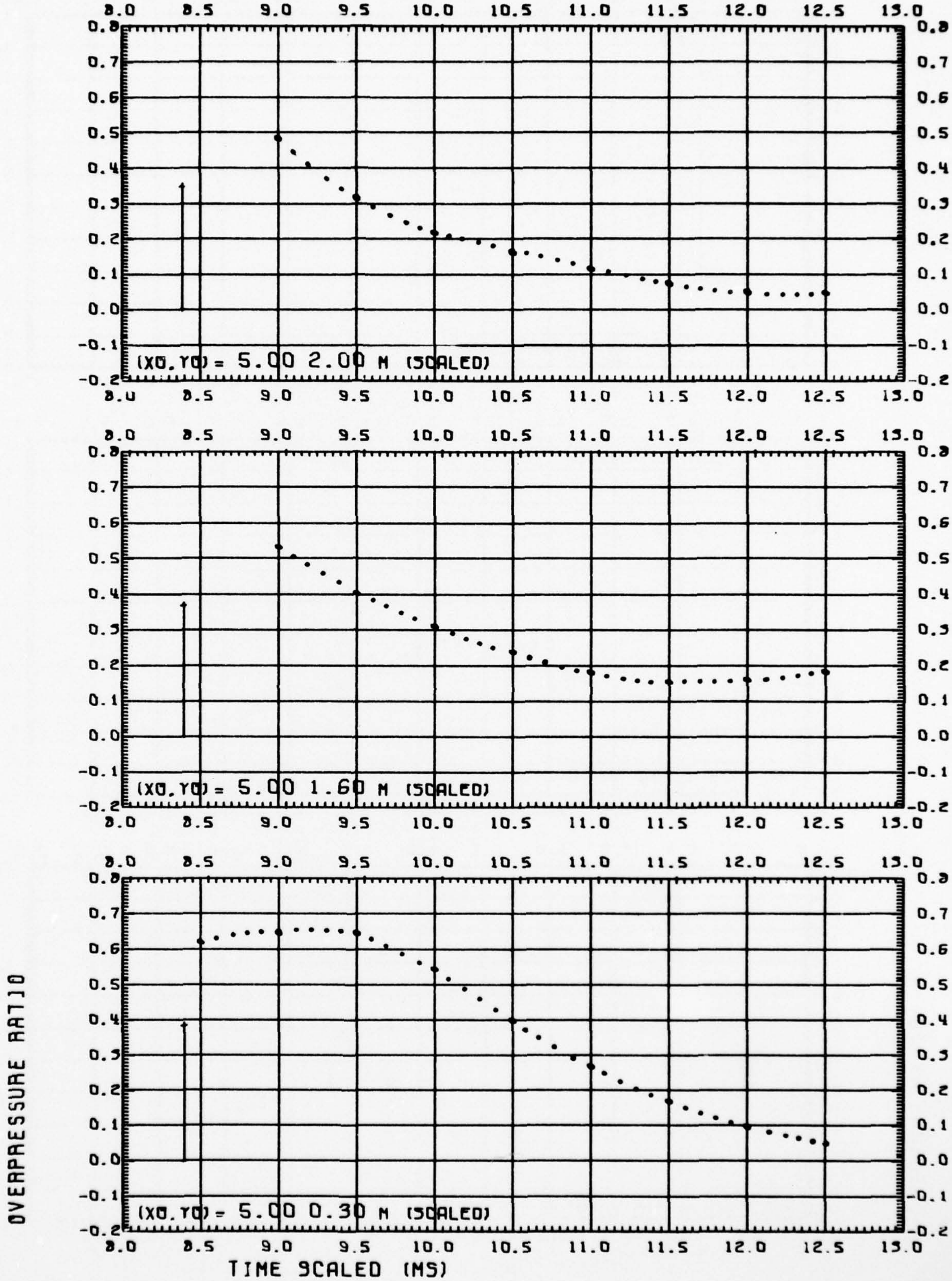

Fig. 25.5 HYDROSTATIC OVERPRESSURE, DIPOLE WEST/8

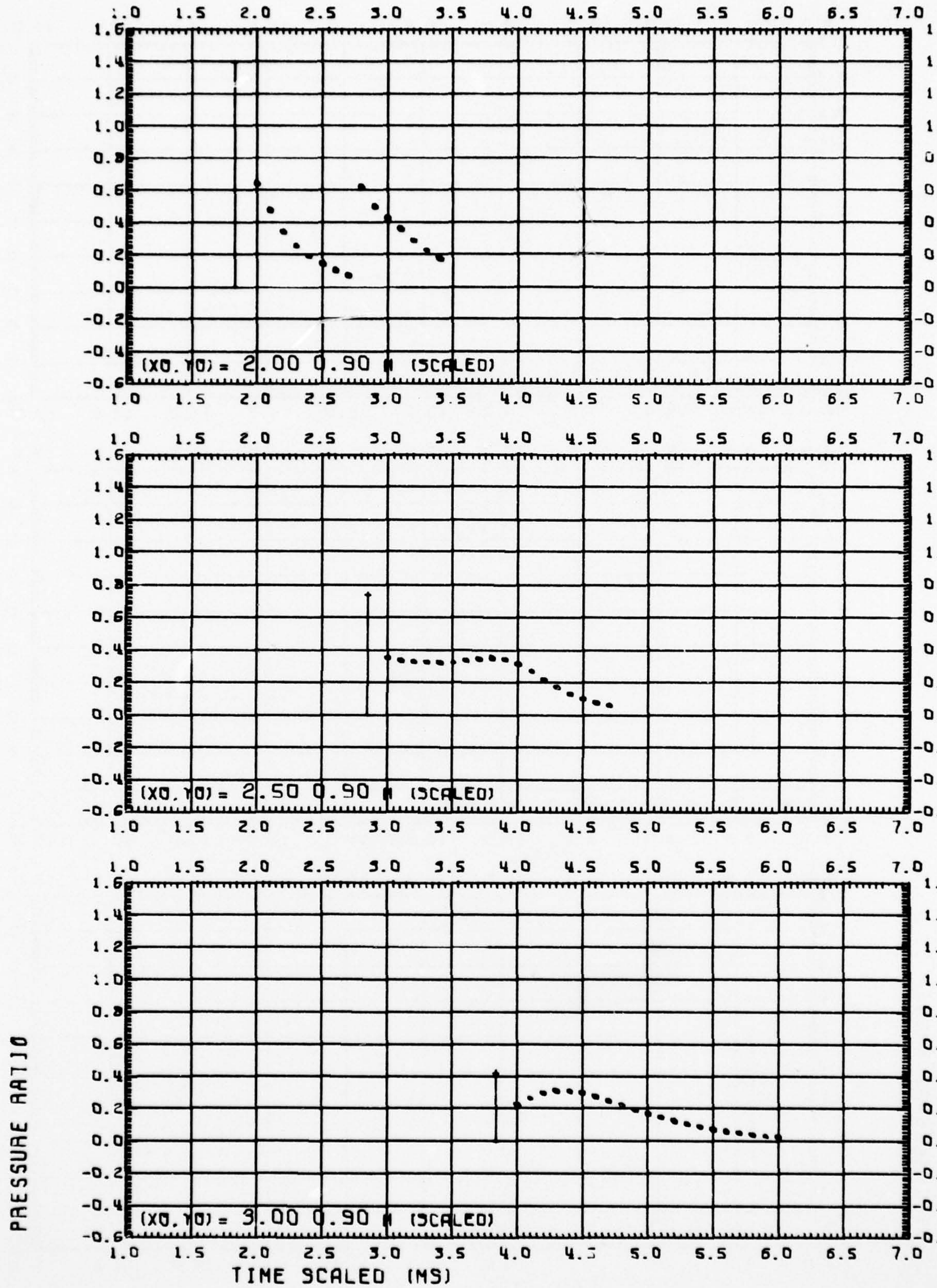

Fig. 26.1 DYNAMIC PRESSURE, DIPOLE WEST/8

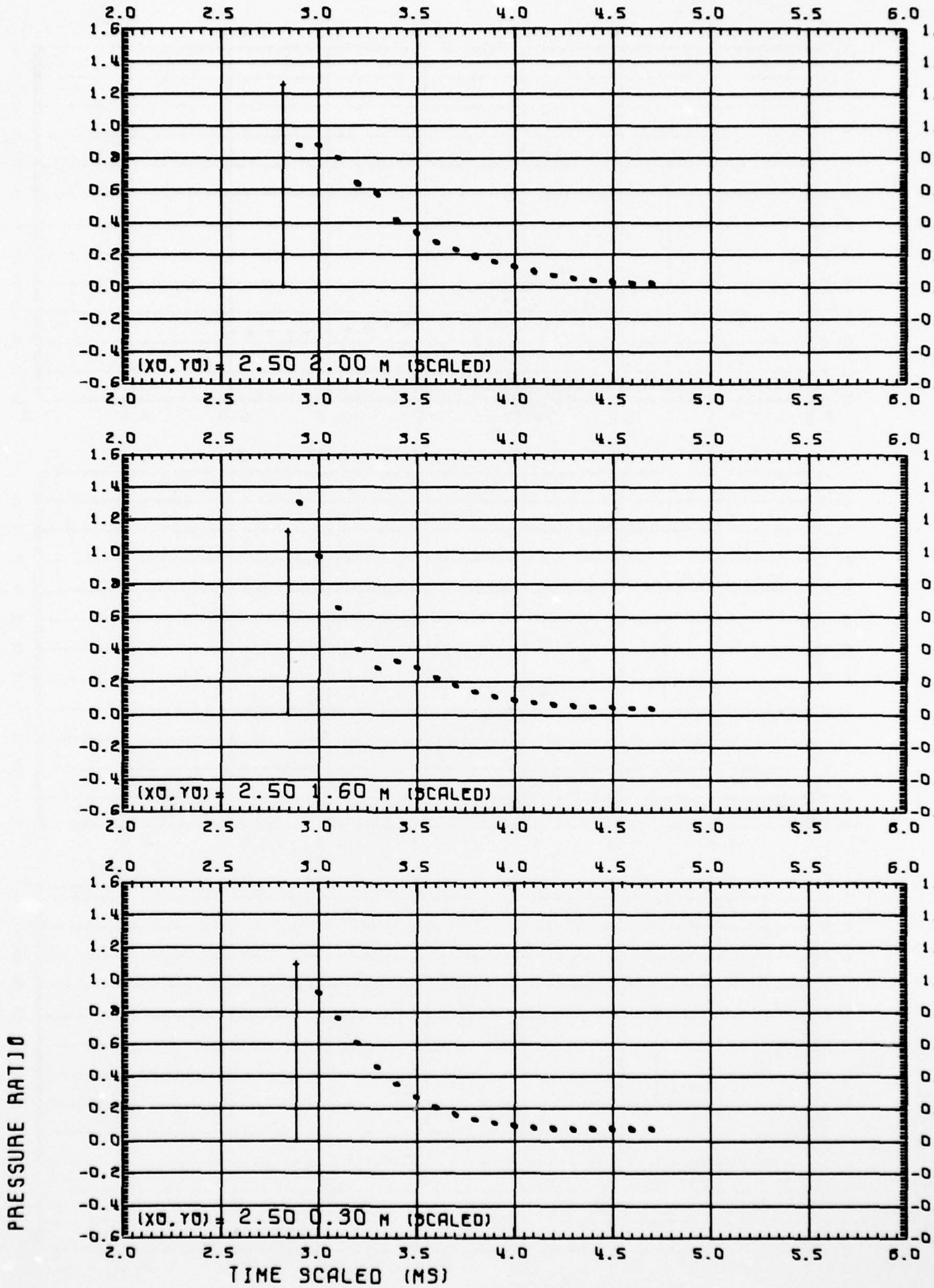

Fig. 26.2 DYNAMIC PRESSURE, DIPOLE WEST/8

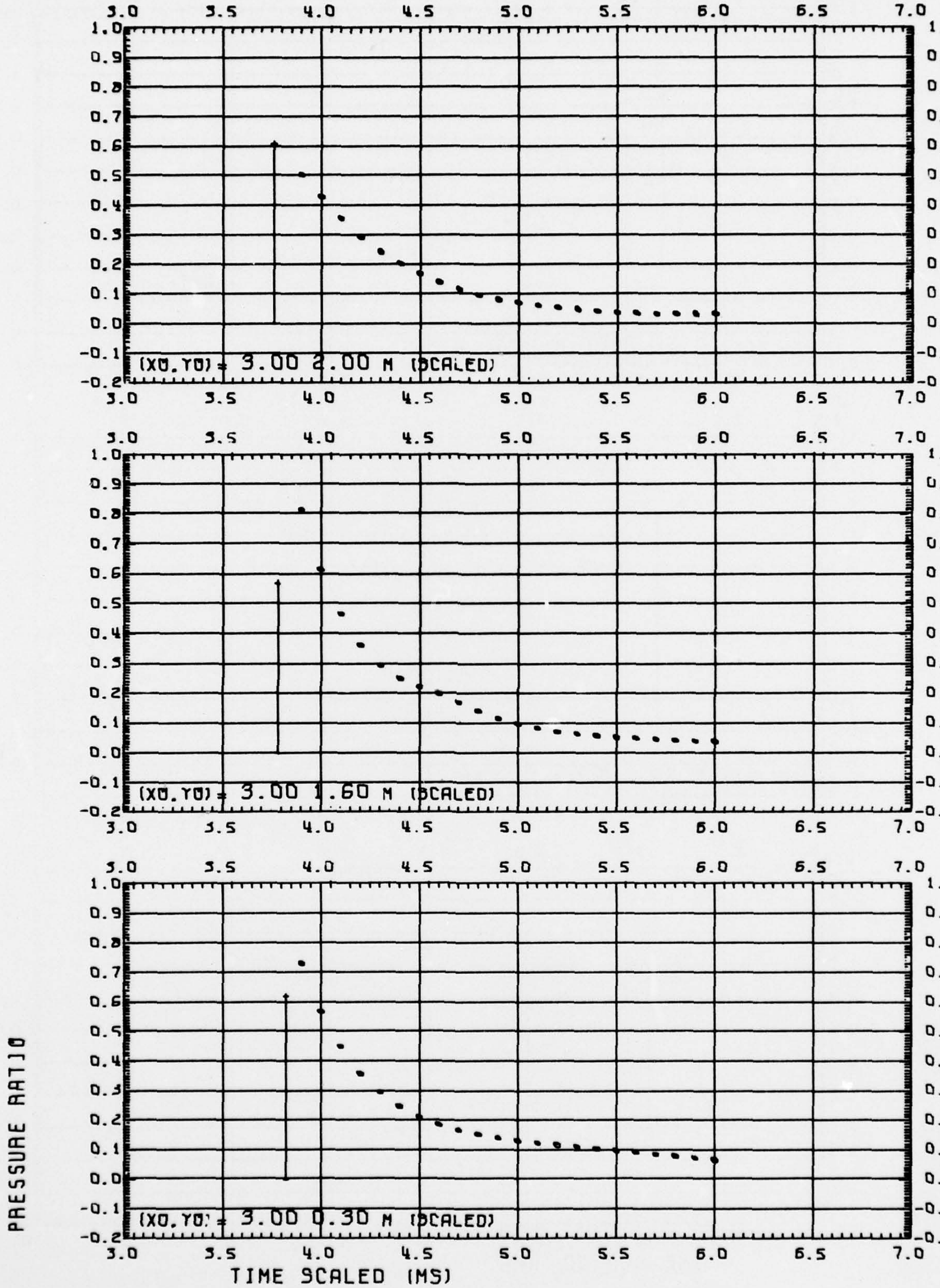

Fig. 26.3 DYNAMIC PRESSURE, DIPOLE WEST/8

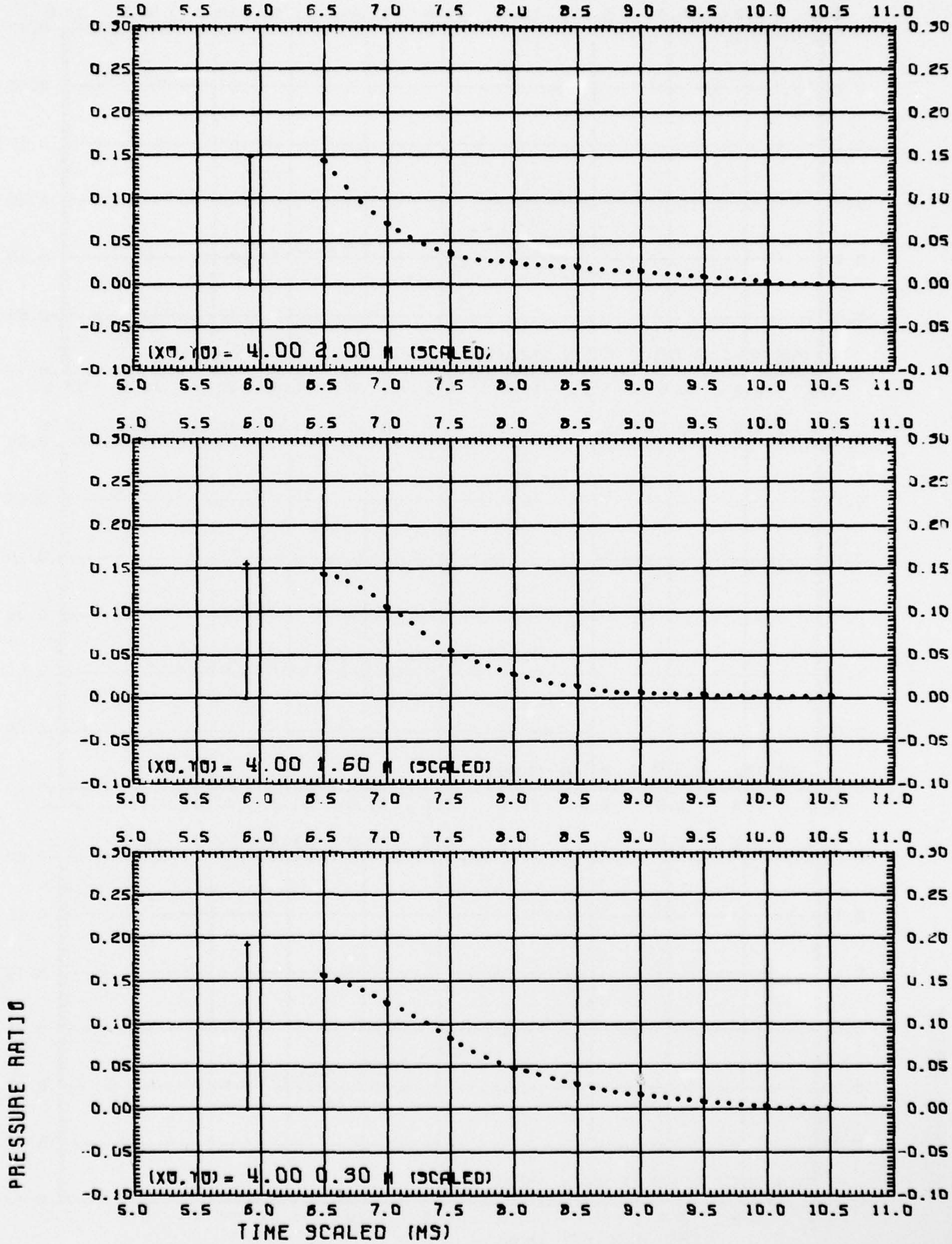

Fig. 26.4 DYNAMIC PRESSURE, DIPOLE WEST/8

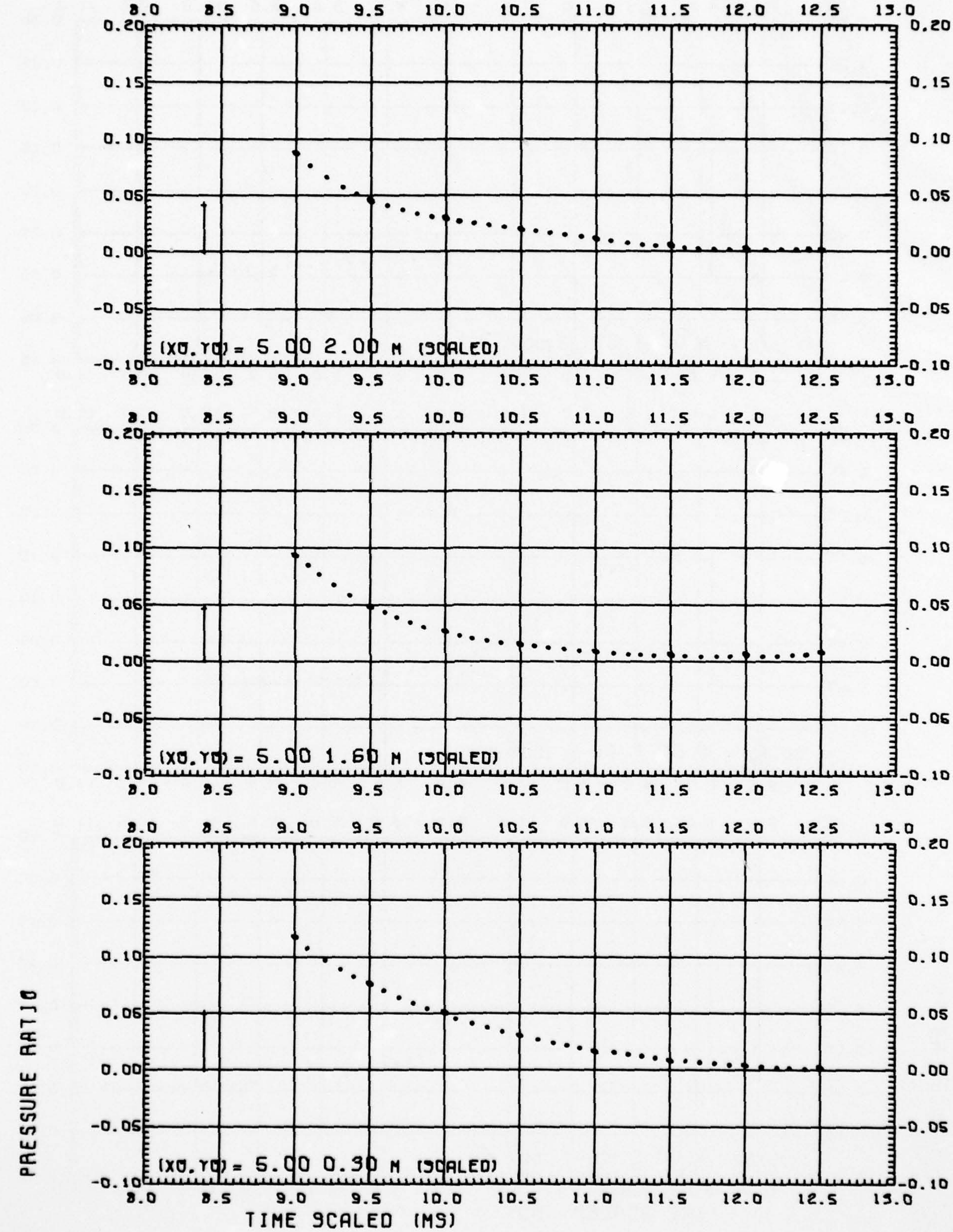

Fig. 26.5 DYNAMIC PRESSURE, DIPOLE WEST/8

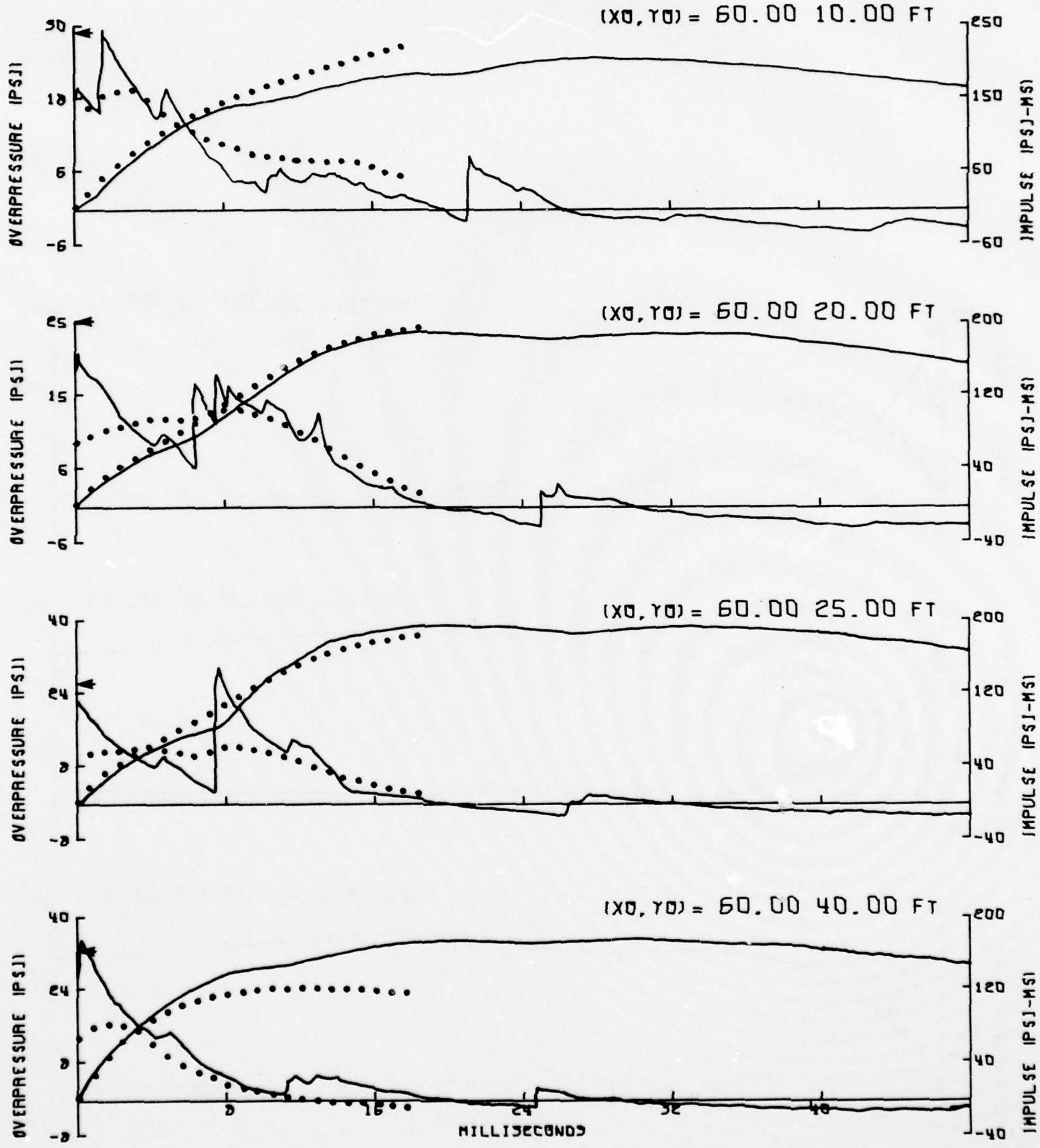

Fig. 27.1 DIPOLE WEST/8 HYDROSTATIC OVERPRESSURE

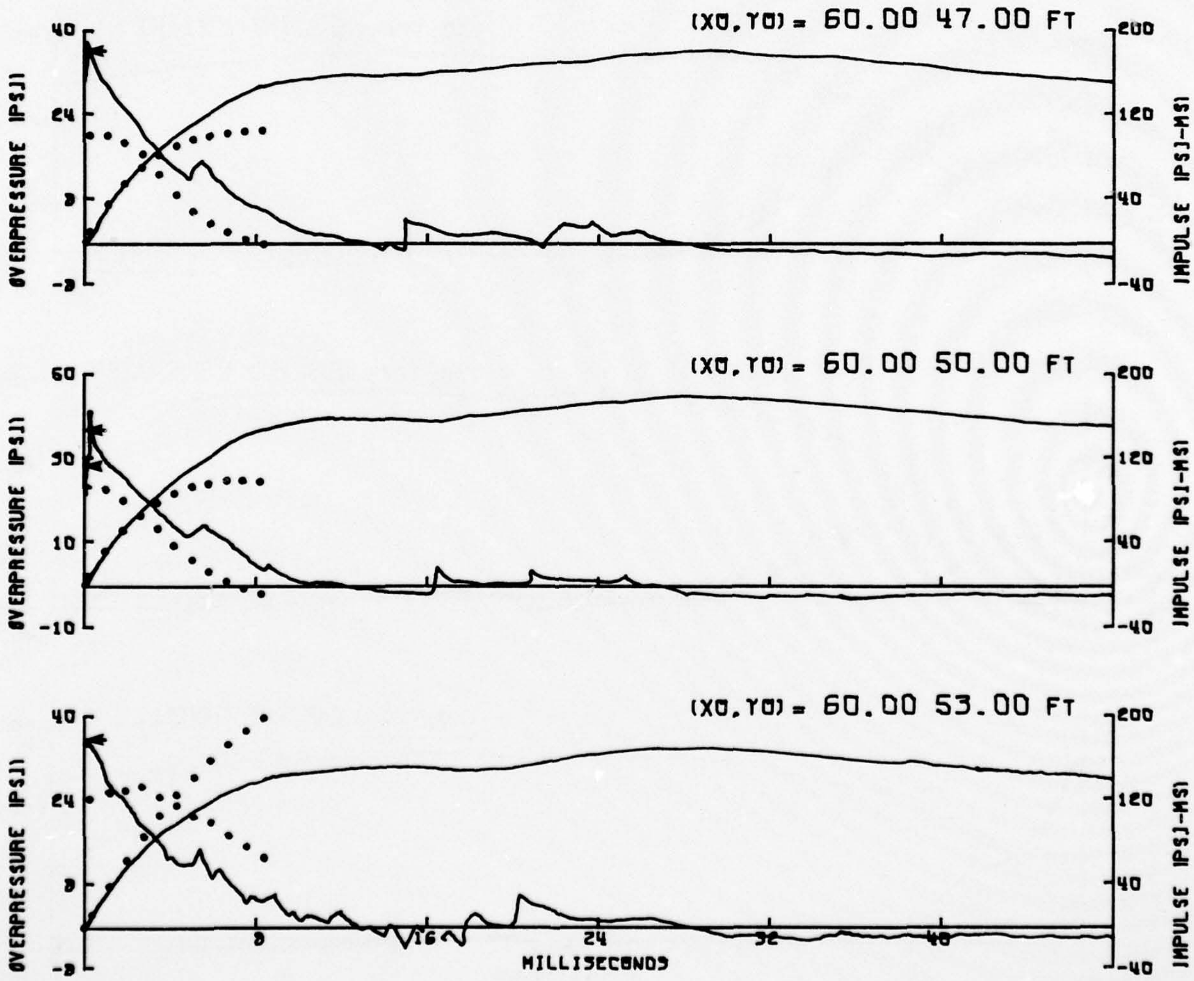

Fig. 27.2 DIPOLE WEST/8 HYDROSTATIC OVERPRESSURE

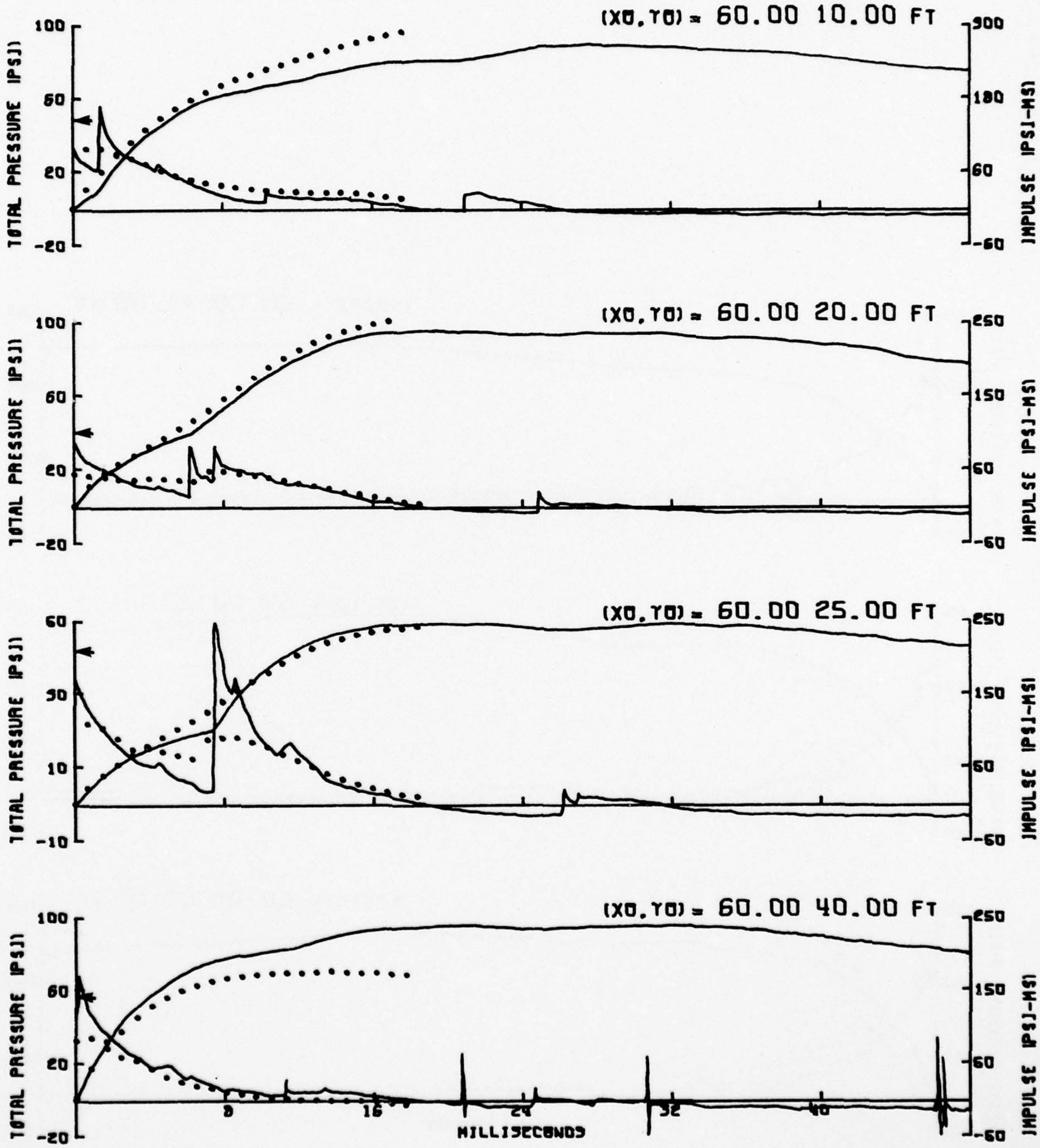

Fig. 27.3 DIPOLE WEST/8 TOTAL PRESSURE

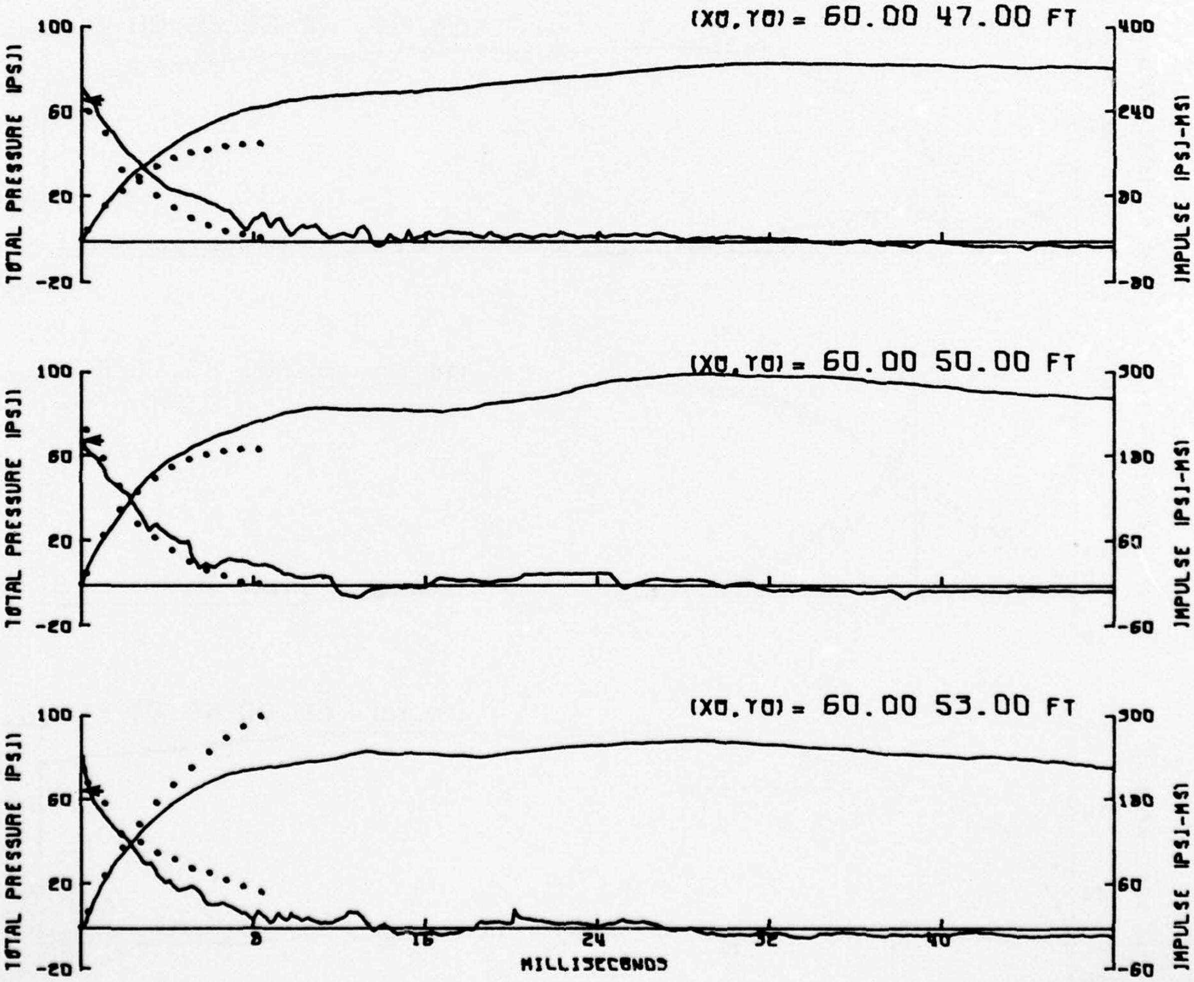

Fig. 27.4 DIPOLE WEST/8 TOTAL PRESSURE

TABLE 1

SURVEY DATA LIST   DIPOLE WEST/8   /A780106

PT. NAME	BEARING	DISTANCE	COORD. E	COORD. N	COORD. H
G.ZERO	0. 0. 0	0.0	2000.000	2000.000	2316.320
G.ZERO B	320.42. 5	0.360	1999.772	2000.279	2316.320
G.ZERO C			1999.662	2000.689	2316.320
B.CHARGE	320.42. 5	0.360	1999.772	2000.279	2340.767
T.CHARGE	337.45. 6	1.187	1999.551	2001.099	2390.628
MCP	180. 2.47	598.713	1998.289	1401.290	2313.750
WF5/295			2003.384	1385.085	2341.843
VP 1A	333.24.43	106.193	1952.648	2095.052	2348.623
VP 1B	333.24.40	106.422	1952.533	2095.250	2383.752
VP 2A	317.56.24	121.905	1918.429	2090.592	2348.640
VP 2B	317.48.50	122.407	1917.996	2090.878	2383.605
VP 3A	305.13.51	149.196	1878.448	2086.514	2348.376
VP 3B	305.12.35	149.142	1878.275	2085.176	2383.340
W 1	257.20.55	35.586	1965.259	1992.289	2318.150
W 2	260.21.43	70.394	1930.578	1983.344	2318.070
W 3	261.29.48	105.189	1895.935	1984.663	2317.350
300 W1	183.38.57	314.780	1979.184	1685.909	2330.730
300 W2	187.40.48	320.020	1956.569	1682.941	2330.280
1-20.10	84. 7.37	19.875	2019.774	2002.002	2326.369
1-20.20	84.12.46	19.889	2019.792	2001.966	2336.381
1-20.25	84. 8.14	19.911	2019.808	2002.022	2341.453
1-20.40	84. 4.43	19.819	2019.717	2002.008	2356.412
1-20.47	83.57.34	19.816	2019.709	2002.056	2363.310
1-20.50	83.56.22	19.792	2019.683	2002.071	2366.338
1-20.53	84. 6.13	19.716	2019.613	2002.014	2369.343
1-30.10	69.25. 1	29.023	2027.171	2010.202	2326.517
1-30.20	68.23. 2	30.020	2027.910	2011.056	2336.462
1-30.25	68.26. 9	30.016	2027.919	2011.021	2341.488
1-30.40	68.36. 6	30.017	2027.950	2010.944	2356.023
1-30.47	68.45. 2	30.016	2027.976	2010.876	2363.505
1-30.50	68.46.45	30.039	2028.023	2010.818	2366.458
1-30.53	68.44.54	30.042	2028.024	2010.923	2369.426

BEARING IN DEGREES, MINUTES AND SECONDS, AND DISTANCE IN FEET
BEARING AND DISTANCE FROM G.ZERO   UNLESS NOTED OTHERWISE
COORDINATES EAST AND NORTH AND ELEVATION IN FEET
NUMBER OF POINTS LISTED ABOVE IS 32

SUNDRY DATA LIST

T= 67.5 DEG F, P= 13.5 PSI, RH= 31.0 %, SVP= 17.2 MM, W= 1080.0 LBS
SCALING TO WO= 2.2 LBS USING FACTORS S= 8.105 AND C= 1.127 FT/MSEC
CALCULATED DISTANCE BETWEEN B.CHARGE AND G.ZERO B IS 24.447 FEET CH
CALCULATED DISTANCE BETWEEN B.CHARGE AND T.CHARGE IS 49.868 FEET CS
CALCULATED DISTANCE BETWEEN G.ZERO AND G.ZERO C IS 0.767 FEET
PENTOLITE SPHERES, FIRED 17 SEP 73, SIMULTANEOUSLY

AD-A058 376 GENERAL ELECTRIC CO ALBUQUERQUE N MEX TEMPO F/G 18/3
PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOT--ETC(U)
JAN 78 J M DEWEY, D J MCMILLIN, D TRILL DNA001-77-C-0305
UNCLASSIFIED DNA-4326F-3 NL

2 OF 2

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TABLE 2

PHOTOGRAMMETRICS

DIPOLE WEST/8   WF5/295   30'   /A780106

CAMERA POSITION IS 2003.4 FEET EAST, 1385.1 FEET NORTH AND 2341.8 FEET ELEVATION
OPTICAL AXIS IS ORIENTED -6.883 DEGREES EAST OF NORTH AND 0.606 DEGREES UPWARD
OBJECT PLANE INCLUDES G.ZERO C AND IS 611.3 FEET FROM CAMERA ALONG OPTICAL AXIS

CALIBRATION DATA TRANSFORMED TO THE OBJECT PLANE IN FEET

PT. NAME	COORD. X	COORD. Y	SHIFT X	SHIFT Y	
B.CHARGE	70.520	-7.511	-0.369	-0.027	
VP 1B	29.505	29.686	0.203	-0.140	
VP 2A	-0.003	-0.548	0.178	-0.066	
VP 2B	-0.269	29.306	0.104	0.124	
VP 3A	-34.257	-0.730	-0.097	-0.117	
VP 3B	-34.523	29.205	0.028	-0.007	
W 1	35.114	-30.320	0.000	-0.000	REFERENCE POINT P1
W 2	-0.220	-30.464	0.232	0.074	
W 3	-34.976	-31.096	-0.000	-0.000	REFERENCE POINT P2
300 W1	24.353	-28.997	0.008	-0.004	REFERENCE POINT P3, P5
300 W2	-21.876	-28.721	0.016	-1.211	REFERENCE POINT P4
1-20.10	91.231	-21.968	-0.940	0.006	
1-20.40	90.710	8.613	-0.473	-0.488	
1-20.47	90.741	15.431	-0.544	-0.405	
1-20.50	90.659	18.478	-0.504	-0.423	
1-20.53	90.754	21.717	-0.688	-0.654	
1-30.10	99.324	-21.763	-1.855	0.130	
1-30.40	99.236	8.300	-1.011	-0.745	
1-30.47	99.253	15.489	-1.034	-0.540	
1-30.50	99.202	18.455	-0.951	-0.586	
1-30.53	99.216	21.598	-0.984	-0.797	
AVERAGES			-0.413	-0.280	

X-AXIS IS PARALLEL TO HORIZONTAL PLANE WITH ORIGIN WHERE OPTICAL AXIS INTERSECTS OBJECT PLANE. SHIFTS GIVE POINT POSITIONS WHICH ARE CALCULATED DIRECTLY FROM SURVEY DATA

MAXIMUM CALIBRATION ERROR SCALED= 0.081 FEET
MAXIMUM CAMERA ORIENTATION ERROR= 0.000 FEET

TOTAL ERRORS IN THE OBJECT PLANE= 0.081 FEET

TABLE 3

FILM TIMING DATA   DIPOLE WEST/8   WF5/295 30°   /A780106

STATIC ZERO = 3.90 CM
ACTUAL ZERO = 4.75 CM
FRAME LENGTH = 0.94625 CM

FRAME NO.	5-MSEC DISTANCE	FILM SPEED
-31	15.78 CM	3335./SEC
69	16.11 CM	3405./SEC
169	16.48 CM	3483./SEC
269	16.79 CM	3549./SEC
369	17.12 CM	3618./SEC
469	17.42 CM	3682./SEC
AVERAGES	16.62 CM	3512./SEC

STATIC ZERO IS CONSTANT FOR THE CAMERA
OTHER DATA ARE OBTAINED BY MEASUREMENT

FRAME TIMES IN MILLISECONDS FOR FRAMES 1 THROUGH 375 ARE:

1	0.6	2	0.9	3	1.2	4	1.5	5	1.8	6	2.1	7	2.4	8	2.7	9	2.9	10	3.2
11	3.5	12	3.8	13	4.1	14	4.4	15	4.7	16	5.0	17	5.3	18	5.6	19	5.9	20	6.2
21	6.5	22	6.8	23	7.1	24	7.4	25	7.7	26	8.0	27	8.3	28	8.6	29	8.9	30	9.2
31	9.5	32	9.8	33	10.1	34	10.4	35	10.7	36	11.0	37	11.3	38	11.5	39	11.8	40	12.1
41	12.4	42	12.7	43	13.0	44	13.3	45	13.6	46	13.9	47	14.2	48	14.5	49	14.8	50	15.1
51	15.4	52	15.7	53	16.0	54	16.3	55	16.6	56	16.9	57	17.2	58	17.5	59	17.7	60	18.0
61	18.3	62	18.6	63	18.9	64	19.2	65	19.5	66	19.8	67	20.1	68	20.4	69	20.7	70	21.0
71	21.3	72	21.6	73	21.9	74	22.2	75	22.4	76	22.7	77	23.0	78	23.3	79	23.6	80	23.9
81	24.2	82	24.5	83	24.8	84	25.1	85	25.4	86	25.7	87	26.0	88	26.3	89	26.5	90	26.8
91	27.1	92	27.4	93	27.7	94	28.0	95	28.3	96	28.6	97	28.9	98	29.2	99	29.5	100	29.8
101	30.0	102	30.3	103	30.6	104	30.9	105	31.2	106	31.5	107	31.8	108	32.1	109	32.4	110	32.7
111	33.0	112	33.2	113	33.5	114	33.8	115	34.1	116	34.4	117	34.7	118	35.0	119	35.3	120	35.6
121	35.9	122	36.2	123	36.4	124	36.7	125	37.0	126	37.3	127	37.6	128	37.9	129	38.2	130	38.5
131	38.8	132	39.1	133	39.3	134	39.6	135	39.9	136	40.2	137	40.5	138	40.8	139	41.1	140	41.4
141	41.7	142	41.9	143	42.2	144	42.5	145	42.8	146	43.1	147	43.4	148	43.7	149	44.0	150	44.3
151	44.5	152	44.8	153	45.1	154	45.4	155	45.7	156	46.0	157	46.3	158	46.6	159	46.8	160	47.1
161	47.4	162	47.7	163	48.0	164	48.3	165	48.6	166	48.9	167	49.1	168	49.4	169	49.7	170	50.0
171	50.3	172	50.6	173	50.9	174	51.1	175	51.4	176	51.7	177	52.0	178	52.3	179	52.6	180	52.9
181	53.2	182	53.4	183	53.7	184	54.0	185	54.3	186	54.6	187	54.9	188	55.2	189	55.4	190	55.7
191	56.0	192	56.3	193	56.6	194	56.9	195	57.2	196	57.4	197	57.7	198	58.0	199	58.3	200	58.6
201	58.9	202	59.2	203	59.4	204	59.7	205	60.0	206	60.3	207	60.6	208	60.9	209	61.1	210	61.4
211	61.7	212	62.0	213	62.3	214	62.6	215	62.9	216	63.1	217	63.4	218	63.7	219	64.0	220	64.3
221	64.6	222	64.8	223	65.1	224	65.4	225	65.7	226	66.0	227	66.3	228	66.5	229	66.8	230	67.1
231	67.4	232	67.7	233	68.0	234	68.2	235	68.5	236	68.8	237	69.1	238	69.4	239	69.7	240	69.9
241	70.2	242	70.5	243	70.8	244	71.1	245	71.4	246	71.6	247	71.9	248	72.2	249	72.5	250	72.8
251	73.1	252	73.3	253	73.6	254	73.9	255	74.2	256	74.5	257	74.8	258	75.0	259	75.3	260	75.6
261	75.9	262	76.2	263	76.4	264	76.7	265	77.0	266	77.3	267	77.6	268	77.9	269	78.1	270	78.4
271	78.7	272	79.0	273	79.3	274	79.5	275	79.8	276	80.1	277	80.4	278	80.7	279	81.0	280	81.2
281	81.5	282	81.8	283	82.1	284	82.4	285	82.6	286	82.9	287	83.2	288	83.5	289	83.8	290	84.0
291	84.3	292	84.6	293	84.9	294	85.2	295	85.4	296	85.7	297	86.0	298	86.3	299	86.6	300	86.8
301	87.1	302	87.4	303	87.7	304	88.0	305	88.2	306	88.5	307	88.8	308	89.1	309	89.4	310	89.6
311	89.9	312	90.2	313	90.5	314	90.8	315	91.0	316	91.3	317	91.6	318	91.9	319	92.2	320	92.4
321	92.7	322	93.0	323	93.3	324	93.6	325	93.8	326	94.1	327	94.4	328	94.7	329	95.0	330	95.2
331	95.5	332	95.8	333	96.1	334	96.3	335	96.6	336	96.9	337	97.2	338	97.5	339	97.7	340	98.0
341	98.3	342	98.6	343	98.8	344	99.1	345	99.4	346	99.7	347	100.0	348	100.2	349	100.5	350	100.8
351	101.1	352	101.3	353	101.6	354	101.9	355	102.2	356	102.5	357	102.7	358	103.0	359	103.3	360	103.6
361	103.8	362	104.1	363	104.4	364	104.7	365	104.9	366	105.2	367	105.5	368	105.8	369	106.0	370	106.3
371	106.6	372	106.9	373	107.2	374	107.4	375	107.7										

TABLE 4

TIMES OF ARRIVAL DIPOLE WEST/8 WF5/295 30' SMOKE PUFF GRID 1220 /A780106

AMBIENT TEMPERATURE T= 19.72 DEGREES CELSIUS
AMBIENT PRESSURE P= 93.22 KILOPASCALS
RELATIVE HUMIDITY RH= 31.0 PER CENT
VAPOUR PRESSURE VP= 0.71 KILOPASCALS
AMBIENT SPEED OF SOUND C= 343.635 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 7.45 METERS
SEPARATION #2 HS= 7.60 METERS
SACHS SCALING FACTOR S= 8.1051
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

INITIAL PUFF POSITIONS, TIMES OF ARRIVAL, AND PEAK PARTICLE VELOCITIES DERIVED BY TRAJECTORY FITTING

PUFF NUMBER	X-OBS METERS	Y-OBS METERS	T-OBS MSEC	X-SCAL METERS	Y-SCAL METERS	T-SCAL MSEC	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGION CODE
1	8.066	17.378	4.732	0.995	2.206	0.590	0.976	-0.364	1.042	1.156	2
2	8.213	16.350	5.920	1.013	2.017	0.738	1.281	-1.144	1.718	1.277	2
3	8.052	14.707	6.514	0.993	1.814	0.812	1.492	0.310	1.524	0.994	4
4	8.066	13.016	5.326	0.995	1.606	0.664	1.756	1.801	2.516	1.209	1
5	8.052	11.707	4.732	0.993	1.444	0.590	1.837	1.113	2.147	1.124	1
6	7.893	10.109	3.840	0.974	1.247	0.478	1.521	0.418	1.578	1.028	1
7	7.986	8.544	3.840	0.985	1.054	0.478	2.194	0.869	2.360	0.995	1
8	7.693	7.144	3.543	0.949	0.881	0.441	2.663	-0.239	2.673	0.950	1
9	7.621	5.571	3.543	0.940	0.687	0.441	2.573	0.621	2.647	0.968	1
10	7.825	4.134	4.137	0.965	0.516	0.515	2.402	-0.940	2.579	1.046	1
11	7.626	2.480	4.732	0.941	0.306	0.590	0.966	-1.079	1.448	1.123	1
12	7.695	0.885	5.920	0.949	0.109	0.738	1.738	-1.153	2.086	1.248	1
13	10.971	18.059	9.293	1.354	2.228	1.033	1.156	-1.027	1.546	1.467	2
14	10.971	15.958	9.478	1.354	1.969	1.181	1.451	-0.437	1.515	1.586	2
15	10.804	14.252	9.182	1.333	1.758	1.144	1.136	0.421	1.212	1.575	1
16	10.902	13.059	8.590	1.345	1.611	1.070	0.990	0.746	1.240	1.513	1
17	10.887	11.330	7.700	1.343	1.398	0.959	0.344	0.301	0.457	1.426	1
18	10.845	10.064	7.107	1.338	1.242	0.885	1.785	-0.038	1.788	1.376	1
19	10.749	8.540	6.810	1.326	1.054	0.849	1.825	0.126	1.829	1.333	1
20	10.775	7.116	6.514	1.329	0.878	0.812	1.736	-0.263	1.756	1.330	1
21	10.790	5.761	6.810	1.331	0.711	0.849	1.507	-0.609	1.625	1.347	1
22	10.615	3.904	7.107	1.310	0.482	0.885	1.506	-0.020	1.506	1.381	1
23	10.527	2.417	7.700	1.299	0.298	0.959	0.674	-0.599	0.901	1.440	1
25	13.779	17.695	12.141	1.700	2.183	1.513	1.108	-0.498	1.215	1.807	2
26	13.758	16.135	12.732	1.697	1.991	1.586	1.776	0.344	1.809	1.703	5
27	13.766	14.730	12.732	1.698	1.817	1.586	1.710	-0.003	1.710	1.699	4
28	13.646	13.184	11.254	1.684	1.627	1.402	0.443	0.184	0.480	1.826	1
29	13.689	11.834	10.958	1.689	1.460	1.365	0.402	0.183	0.442	1.773	1
30	13.801	10.191	10.958	1.703	1.257	1.365	0.919	0.087	0.923	1.736	1
31	13.626	8.710	10.958	1.681	1.075	1.365	1.611	0.011	1.611	1.688	1
32	13.775	7.254	11.254	1.700	0.895	1.402	1.477	-0.380	1.525	1.700	1
33	13.742	5.745	10.958	1.695	0.709	1.365	1.373	-0.264	1.398	1.709	1
34	13.540	4.145	11.254	1.671	0.511	1.402	1.136	-0.568	1.270	1.720	1
35	13.599	2.495	11.845	1.678	0.308	1.476	0.742	-0.558	0.929	1.786	1
36	14.710	0.881	15.093	1.815	0.109	1.880	0.830	-0.127	0.840	1.818	3
37	15.811	17.410	15.093	1.951	2.148	1.880	0.909	-0.208	0.933	2.055	2
38	15.672	15.956	15.093	1.934	1.970	1.880	1.596	0.123	1.600	1.937	5
39	15.785	14.170	15.093	1.948	1.748	1.880	1.376	0.045	1.376	1.951	4
40	15.878	12.829	15.093	1.959	1.583	1.880	0.874	0.090	0.878	2.068	1
41	15.669	11.356	14.208	1.933	1.401	1.770	0.718	0.354	0.801	1.992	1
42	15.832	10.005	13.913	1.953	1.234	1.733	0.807	0.260	0.848	1.979	1
43	15.666	8.386	13.913	1.933	1.035	1.733	1.375	-0.040	1.375	1.936	1
44	15.804	6.909	13.913	1.950	0.852	1.733	0.837	-0.108	0.844	1.951	1
45	15.854	5.445	14.208	1.956	0.672	1.770	0.846	-0.288	0.893	1.972	1
46	15.646	3.908	14.503	1.930	0.482	1.807	0.999	-0.348	1.058	1.979	1

TABLE 4 (continued)

47	15.717	2.343	15.388	1.939	0.289	1.917	0.854	-0.216	0.881	2.039	1
48	15.715	0.984	15.683	1.939	0.121	1.954	1.284	0.008	1.284	1.943	3
49	17.891	17.470	18.922	2.207	2.155	2.357	1.605	-0.064	1.606	2.227	5
50	17.857	15.699	18.333	2.203	1.937	2.284	1.179	0.154	1.189	2.205	5
51	17.860	14.414	18.039	2.203	1.778	2.248	1.006	-0.143	1.016	2.205	4
52	17.845	12.609	18.333	2.202	1.556	2.284	1.052	-0.219	1.075	2.222	4
53	17.903	11.395	18.333	2.209	1.406	2.284	0.785	0.127	0.795	2.262	1
54	17.805	9.902	17.450	2.197	1.222	2.174	0.806	0.218	0.835	2.217	1
55	17.775	8.291	17.450	2.193	1.023	2.174	0.802	-0.029	0.802	2.196	1
56	17.839	6.951	17.450	2.201	0.858	2.174	0.889	-0.143	0.901	2.202	1
57	17.916	5.493	17.450	2.210	0.678	2.174	0.600	-0.284	0.664	2.224	1
58	17.841	3.929	18.333	2.201	0.485	2.284	0.667	-0.383	0.769	2.244	1
59	17.723	2.404	18.333	2.187	0.297	2.284	0.839	-0.069	0.842	2.274	1
60	17.869	0.889	18.922	2.205	0.110	2.357	1.104	0.846	1.391	2.207	3
61	20.112	17.390	22.738	2.481	2.146	2.833	0.780	0.024	0.780	2.498	5
62	20.285	16.058	22.738	2.503	1.981	2.833	0.779	-0.035	0.779	2.506	5
63	20.146	14.525	22.738	2.486	1.792	2.833	1.011	-0.128	1.019	2.486	4
64	20.145	12.898	22.738	2.485	1.591	2.833	1.078	-0.137	1.086	2.500	4
65	19.996	11.374	22.738	2.467	1.403	2.833	1.165	-0.087	1.168	2.514	1
66	20.122	9.894	23.032	2.483	1.221	2.870	0.933	0.065	0.935	2.501	1
67	20.052	8.425	22.738	2.474	1.039	2.833	0.648	-0.055	0.650	2.477	1
68	20.126	7.093	22.738	2.483	0.875	2.833	0.577	-0.156	0.598	2.483	1
69	20.059	5.496	23.032	2.475	0.678	2.870	0.598	-0.220	0.637	2.487	1
70	20.009	4.042	22.738	2.469	0.499	2.833	0.739	-0.308	0.801	2.504	1
71	20.041	2.357	22.738	2.473	0.291	2.833	0.977	-0.029	0.977	2.490	3
72	19.982	0.774	22.738	2.465	0.095	2.833	1.019	-0.153	1.030	2.467	3
73	21.868	17.432	24.496	2.698	2.157	3.052	0.692	-0.027	0.692	2.715	5
74	21.922	15.779	25.082	2.705	1.947	3.125	0.593	0.231	0.636	2.706	5
75	21.936	14.318	26.252	2.706	1.767	3.271	0.781	-0.045	0.782	2.708	4
76	21.984	12.826	24.495	2.712	1.582	3.052	0.450	0.049	0.453	2.726	4
77	21.976	11.392	24.496	2.711	1.405	3.052	0.379	-0.098	0.391	2.749	4
78	21.841	9.940	24.789	2.695	1.226	3.088	0.621	0.020	0.621	2.712	1
79	22.056	8.472	24.789	2.721	1.045	3.088	0.244	0.018	0.244	2.724	1
80	21.996	6.829	25.959	2.714	0.843	3.234	0.535	-0.033	0.536	2.715	1
81	22.081	5.426	25.667	2.724	0.669	3.198	0.363	-0.050	0.366	2.736	1
82	22.043	3.892	26.836	2.720	0.480	3.344	0.825	0.008	0.825	2.762	3
83	22.196	2.437	26.836	2.738	0.301	3.344	0.921	0.054	0.923	2.755	3
84	22.107	0.845	26.252	2.728	0.104	3.271	0.854	-0.028	0.854	2.730	3
85	24.050	17.503	29.755	2.967	2.171	3.707	0.729	0.065	0.732	2.984	5
86	24.126	16.025	30.047	2.977	1.977	3.744	0.745	0.098	0.752	2.979	5
87	24.087	14.515	30.047	2.972	1.791	3.744	1.133	-0.196	1.149	2.973	4
88	24.144	12.982	30.333	2.979	1.602	3.780	0.972	-0.312	1.020	2.990	4
89	24.221	11.441	30.630	2.988	1.412	3.816	1.061	-0.235	1.087	3.021	4
90	24.147	9.905	30.630	2.979	1.222	3.816	0.769	-0.272	0.816	3.046	4
91	24.110	8.387	29.755	2.975	1.035	3.707	0.346	-0.078	0.355	2.977	1
92	24.168	6.906	30.630	2.982	0.852	3.816	0.400	-0.109	0.415	2.983	1
93	24.163	5.374	30.921	2.981	0.663	3.852	0.608	0.083	0.614	2.992	1
94	24.037	3.892	30.630	2.966	0.480	3.816	0.768	-0.011	0.768	3.004	3
95	24.301	2.411	30.630	2.998	0.297	3.816	0.946	-0.016	0.946	3.013	3
96	24.198	0.893	30.333	2.985	0.110	3.780	0.846	-0.006	0.846	2.988	3
97	25.543	17.564	31.795	3.151	2.167	3.961	0.538	-0.003	0.538	3.167	5
98	25.686	15.975	32.958	3.169	1.971	4.106	0.659	-0.032	0.660	3.171	5
99	25.666	14.420	31.503	3.167	1.779	3.925	0.682	-0.012	0.682	3.168	4
100	25.740	12.920	32.668	3.176	1.594	4.070	0.904	-0.108	0.910	3.187	4
101	25.671	11.415	31.795	3.167	1.408	3.961	0.369	-0.104	0.384	3.199	4
102	25.656	9.903	31.503	3.165	1.222	3.925	0.217	-0.130	0.253	3.228	4
103	25.621	8.374	33.831	3.161	1.033	4.215	0.520	-0.181	0.551	3.163	1
104	25.590	6.780	33.831	3.157	0.836	4.215	0.485	-0.065	0.490	3.158	1
105	25.721	5.370	33.831	3.173	0.663	4.215	0.502	0.096	0.511	3.242	3
106	25.830	3.829	33.831	3.187	0.472	4.215	0.682	-0.039	0.683	3.222	3
107	25.732	2.381	33.249	3.175	0.294	4.143	0.617	-0.145	0.634	3.188	3
108	25.787	0.740	32.958	3.182	0.091	4.106	0.648	-0.010	0.648	3.183	3
109	27.034	17.270	35.573	3.335	2.131	4.432	0.834	0.096	0.839	3.347	5
110	27.129	15.708	35.573	3.347	1.938	4.432	0.942	0.111	0.949	3.348	5

TABLE 4 (continued)

111	27.004	13.391	34.992	3.332	1.714	4.360	0.603	0.037	0.604	3.335	4
112	27.119	12.541	34.992	3.346	1.547	4.360	0.506	-0.122	0.520	3.360	4
113	27.124	11.059	35.573	3.347	1.366	4.432	0.564	-0.123	0.577	3.382	4
114	27.176	9.774	34.992	3.353	1.206	4.360	0.149	-0.129	0.197	3.416	4
115	27.123	8.252	35.733	3.346	1.018	4.577	0.438	-0.219	0.489	3.450	4
116	27.299	6.778	37.313	3.368	0.836	4.649	0.556	-0.045	0.558	3.369	1
117	27.179	5.263	37.313	3.353	0.649	4.649	0.590	0.038	0.596	3.416	3
118	27.217	3.884	36.733	3.358	0.479	4.577	0.600	0.155	0.620	3.392	3
119	27.366	2.242	36.733	3.376	0.277	4.577	0.723	0.101	0.730	3.388	3
120	27.187	0.760	35.573	3.354	0.094	4.432	0.670	0.034	0.673	3.356	3
121	28.546	17.261	39.051	3.522	2.130	4.865	0.770	0.130	0.781	3.532	5
122	28.657	15.740	39.051	3.536	1.942	4.865	0.696	0.025	0.697	3.537	5
123	28.638	14.205	39.051	3.533	1.753	4.865	0.890	-0.151	0.902	3.535	4
124	28.673	12.815	39.051	3.538	1.581	4.865	0.521	-0.030	0.522	3.548	4
125	28.684	11.212	39.051	3.539	1.383	4.865	0.656	-0.115	0.666	3.571	4
126	28.575	9.734	39.051	3.526	1.201	4.865	0.626	-0.210	0.660	3.586	4
127	28.583	8.351	39.051	3.527	1.030	4.865	0.376	-0.156	0.407	3.622	4
128	28.632	6.822	40.208	3.533	0.842	5.010	0.572	-0.057	0.575	3.631	3
129	28.697	5.335	40.208	3.541	0.658	5.010	0.610	0.036	0.616	3.601	3
130	28.851	3.865	40.208	3.560	0.477	5.010	0.564	0.155	0.585	3.591	3
131	28.878	2.200	39.051	3.563	0.271	4.865	0.476	0.118	0.490	3.573	3
132	28.841	0.685	39.051	3.558	0.085	4.865	0.571	-0.012	0.571	3.559	3
133	29.999	17.204	40.208	3.701	2.123	5.010	0.279	0.034	0.281	3.711	5
134	30.102	15.807	39.630	3.714	1.950	4.938	0.321	0.053	0.326	3.715	5
135	30.112	14.006	41.364	3.715	1.728	5.154	0.558	0.076	0.563	3.717	4
136	30.109	12.617	41.364	3.715	1.557	5.154	0.440	-0.124	0.457	3.727	4
137	30.042	11.131	40.208	3.707	1.373	5.010	0.195	-0.094	0.217	3.738	4
138	29.977	9.549	40.786	3.699	1.178	5.082	0.298	-0.105	0.316	3.760	4
139	30.053	8.072	41.942	3.708	0.996	5.226	0.326	-0.081	0.336	3.807	4
140	30.262	6.790	43.673	3.734	0.838	5.441	0.621	-0.062	0.624	3.826	3
141	30.227	5.306	43.673	3.729	0.655	5.441	0.599	0.113	0.610	3.786	3
142	30.109	3.857	41.942	3.715	0.476	5.226	0.417	0.144	0.441	3.745	3
143	30.143	2.205	41.942	3.719	0.272	5.226	0.439	0.113	0.453	3.729	3
144	30.137	0.594	41.942	3.718	0.073	5.226	0.488	-0.038	0.489	3.719	3
145	31.739	17.139	45.978	3.916	2.114	5.729	0.623	0.163	0.644	3.924	5
146	31.680	15.611	45.402	3.909	1.926	5.657	0.635	0.104	0.643	3.909	5
147	31.590	14.076	45.402	3.898	1.737	5.657	0.532	-0.037	0.534	3.899	4
148	31.651	12.606	45.402	3.905	1.555	5.657	0.415	-0.095	0.426	3.917	4
149	31.709	11.047	46.554	3.912	1.363	5.800	0.572	-0.083	0.578	3.943	4
150	31.709	9.647	45.402	3.912	1.190	5.657	0.538	-0.109	0.549	3.969	4
151	31.729	8.130	46.554	3.915	1.003	5.800	0.559	-0.108	0.570	4.007	4
152	31.714	6.601	45.978	3.913	0.814	5.729	0.534	0.029	0.535	3.997	3
153	31.741	5.245	45.978	3.916	0.647	5.729	0.483	0.085	0.491	3.969	3
154	31.816	3.416	45.402	3.925	0.421	5.657	0.340	0.174	0.382	3.948	3
155	31.792	1.922	45.978	3.922	0.237	5.729	0.465	0.080	0.472	3.930	3
156	32.676	0.358	51.150	4.032	0.044	6.373	0.303	0.063	0.310	4.032	3
157	33.269	17.329	50.576	4.105	2.138	6.301	0.580	0.000	0.580	4.114	5
158	33.130	15.849	49.428	4.088	1.955	6.158	0.709	0.012	0.710	4.089	5
159	33.180	14.043	49.428	4.094	1.733	6.158	0.590	-0.064	0.593	4.096	4
160	33.202	12.642	49.428	4.096	1.560	6.158	0.586	-0.069	0.590	4.107	4
161	33.315	11.204	49.428	4.110	1.382	6.158	0.352	-0.107	0.368	4.133	4
162	33.218	9.690	49.428	4.098	1.194	6.158	0.452	-0.100	0.463	4.152	4
163	33.286	8.200	49.428	4.107	1.012	6.158	0.508	-0.121	0.522	4.193	4
164	33.243	6.805	49.428	4.101	0.840	6.158	0.562	0.020	0.563	4.187	3
165	33.297	5.469	49.428	4.108	0.675	6.158	0.582	0.045	0.584	4.163	3
166	33.353	3.619	49.428	4.115	0.446	6.158	0.510	-0.036	0.511	4.139	3
167	33.305	2.219	49.428	4.109	0.274	6.158	0.440	0.028	0.441	4.118	3
168	33.395	0.566	49.428	4.120	0.070	6.158	0.408	0.017	0.409	4.121	3
169	34.898	17.523	54.014	4.306	2.162	6.730	0.523	-0.069	0.528	4.316	5
170	34.855	15.960	54.014	4.300	1.969	6.730	0.566	0.012	0.566	4.302	5
171	34.854	14.133	54.014	4.300	1.744	6.730	0.464	-0.105	0.475	4.302	4
172	34.955	12.867	54.014	4.313	1.588	6.730	0.472	-0.133	0.491	4.321	4
173	34.924	11.191	54.014	4.309	1.381	6.730	0.473	-0.063	0.477	4.335	4
174	34.805	9.841	54.014	4.294	1.214	6.730	0.655	-0.036	0.656	4.342	4

TABLE 4 (continued)

175	34.944	8.271	54.014	4.311	1.020	6.730	0.649	0.042	0.650	4.392	4
176	34.946	6.771	54.014	4.312	0.835	6.730	0.673	0.051	0.675	4.392	3
177	34.859	5.308	54.014	4.301	0.655	6.730	0.694	-0.014	0.694	4.350	3
178	34.857	3.772	54.014	4.301	0.465	6.730	0.612	-0.030	0.612	4.326	3
179	34.999	2.190	54.014	4.318	0.270	6.730	0.527	0.005	0.527	4.327	3
180	34.999	0.619	54.014	4.318	0.076	6.730	0.542	-0.018	0.542	4.319	3
181	36.350	17.301	55.730	4.485	2.135	6.943	0.390	-0.087	0.400	4.493	5
182	36.173	15.617	55.730	4.463	1.927	6.943	0.512	-0.044	0.514	4.464	5
183	36.196	14.156	55.158	4.466	1.747	6.872	0.351	-0.129	0.374	4.467	4
184	36.278	12.614	55.158	4.476	1.556	6.872	0.291	-0.160	0.332	4.486	4
185	36.258	11.117	55.158	4.474	1.372	6.872	0.282	-0.082	0.294	4.500	4
186	36.236	9.613	55.158	4.471	1.186	6.872	0.299	-0.027	0.300	4.521	4
187	36.308	8.058	55.158	4.480	0.994	6.872	0.375	-0.029	0.377	4.562	4
188	36.252	6.671	55.730	4.473	0.823	6.943	0.500	-0.028	0.501	4.548	3
189	36.323	5.219	55.158	4.482	0.644	6.872	0.406	-0.035	0.408	4.528	3
190	36.364	3.737	56.301	4.486	0.461	7.015	0.463	-0.142	0.484	4.510	3
191	36.380	2.157	56.301	4.489	0.266	7.015	0.394	-0.068	0.399	4.496	3
192	36.482	0.614	55.730	4.501	0.076	6.943	0.280	-0.093	0.296	4.502	3
193	37.904	17.371	60.010	4.677	2.143	7.477	0.422	-0.045	0.424	4.685	5
194	37.947	15.919	60.010	4.682	1.964	7.477	0.377	-0.080	0.385	4.683	5
195	37.886	14.136	60.010	4.674	1.744	7.477	0.423	-0.131	0.443	4.676	4
196	37.863	12.508	60.010	4.672	1.543	7.477	0.371	-0.166	0.406	4.682	4
197	37.823	11.123	60.010	4.667	1.372	7.477	0.457	-0.098	0.467	4.692	4
198	37.833	9.603	60.010	4.668	1.185	7.477	0.437	-0.096	0.448	4.716	4
199	37.771	8.249	60.010	4.660	1.018	7.477	0.515	0.008	0.515	4.735	4
200	37.856	6.517	60.010	4.671	0.804	7.477	0.523	0.048	0.525	4.739	3
201	37.820	5.114	60.010	4.666	0.631	7.477	0.583	-0.184	0.611	4.709	3
202	37.903	3.627	60.010	4.676	0.447	7.477	0.484	-0.073	0.489	4.698	3
203	37.982	2.170	60.010	4.686	0.268	7.477	0.359	-0.037	0.361	4.694	3
204	38.007	0.624	60.010	4.689	0.077	7.477	0.347	0.002	0.347	4.690	3
205	39.463	17.250	65.697	4.869	2.128	8.185	0.500	-0.083	0.506	4.876	5
206	39.562	15.567	65.697	4.881	1.921	8.185	0.678	-0.000	0.678	4.882	5
207	39.466	14.199	65.697	4.869	1.752	8.185	0.552	-0.061	0.556	4.870	4
208	39.527	12.627	65.697	4.877	1.558	8.185	0.541	-0.071	0.546	4.886	4
209	39.493	11.133	65.697	4.873	1.374	8.185	0.798	-0.032	0.799	4.897	4
210	39.409	9.559	65.697	4.862	1.179	8.185	0.737	-0.053	0.739	4.909	4
211	39.639	8.115	65.981	4.891	1.001	8.221	0.700	0.089	0.706	4.965	4
212	39.491	6.777	65.697	4.872	0.836	8.185	0.776	-0.036	0.777	4.944	3
213	39.515	5.076	65.697	4.875	0.626	8.185	0.665	-0.059	0.668	4.915	3
214	39.553	3.604	65.981	4.880	0.445	8.221	0.612	-0.085	0.618	4.900	3
215	39.609	2.001	65.697	4.887	0.247	8.185	0.575	-0.069	0.579	4.893	3
216	39.569	0.635	65.697	4.882	0.078	8.185	0.469	-0.087	0.477	4.883	3
217	40.920	17.115	68.250	5.049	2.112	8.503	0.453	-0.027	0.453	5.055	5
218	41.006	15.625	68.250	5.059	1.928	8.503	0.533	0.015	0.533	5.060	5
219	41.016	14.103	68.250	5.061	1.740	8.503	0.397	-0.025	0.398	5.062	4
220	40.807	12.388	68.250	5.035	1.528	8.503	0.526	-0.022	0.527	5.045	4
221	41.030	11.136	68.533	5.062	1.374	8.539	0.561	0.040	0.563	5.085	4
222	41.064	9.503	68.533	5.066	1.173	8.539	0.636	-0.090	0.643	5.112	4
223	40.979	8.145	68.250	5.056	1.005	8.503	0.579	-0.032	0.580	5.127	4
224	41.038	6.623	68.250	5.063	0.817	8.503	0.629	-0.001	0.629	5.129	3
225	41.110	5.392	68.250	5.072	0.665	8.503	0.617	-0.026	0.618	5.115	3
226	41.080	3.497	68.250	5.068	0.432	8.503	0.556	-0.098	0.564	5.087	3
227	41.039	1.929	68.250	5.063	0.238	8.503	0.438	-0.057	0.443	5.069	3
228	41.077	0.409	68.250	5.068	0.050	8.503	0.467	-0.013	0.468	5.068	3
229	42.243	17.499	69.383	5.212	2.159	8.644	0.246	-0.098	0.265	5.221	5
230	42.225	15.858	69.100	5.210	1.957	8.609	0.274	-0.102	0.292	5.211	5
231	42.466	14.163	69.100	5.239	1.747	8.609	0.128	-0.085	0.154	5.241	4
232	42.452	12.820	69.383	5.238	1.582	8.644	0.187	-0.103	0.213	5.245	4
233	42.347	11.182	69.383	5.225	1.380	8.644	0.337	-0.059	0.342	5.247	4
234	42.432	9.657	69.100	5.235	1.191	8.609	0.210	-0.120	0.242	5.277	4
235	42.508	8.208	69.100	5.245	1.013	8.609	0.287	-0.007	0.287	5.312	4
236	42.333	6.780	69.100	5.223	0.837	8.609	0.370	-0.031	0.371	5.290	3
237	42.467	5.209	69.100	5.240	0.643	8.609	0.347	-0.018	0.348	5.279	3
238	42.356	3.554	69.949	5.226	0.439	8.715	0.435	-0.043	0.437	5.244	3

TABLE 4 (continued)

239	42.316	2.068	69.100	5.221	0.255	8.609	0.225	-0.063	0.233	5.227	3
240	42.463	0.322	69.100	5.239	0.040	8.609	0.136	0.002	0.136	5.239	3

X IS DISTANCE MEASURED HORIZONTALLY FROM GROUND ZERO,
Y IS DISTANCE MEASURED VERTICALLY ABOVE GROUND ZERO, AND
T IS TIME-OF-ARRIVAL INDICATED BY THE PUFF TRAJECTORY.
VELOCITIES ARE DERIVATIVES AT THE TIME OF ARRIVAL,
AND ARE EXPRESSED IN MACH UNITS RELATIVE TO C ABOVE.
R IS A RADIUS CALCULATED ACCORDING TO REGIONS DEFINED
ON BASIS OF FIRST SHOCK FRONT PASSING, CODED USING:

1= PRIMARY FRONT FROM LOWER CHARGE
2= PRIMARY FRONT FROM UPPER CHARGE
3= MACH STEM AT GROUND SURFACE
4= MACH STEM BELOW INTERACTION PLANE
5= MACH STEM ABOVE INTERACTION PLANE

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS).
VELOCITY EXPRESSED IN MACH UNITS IS INVARIANT UNDER SCALING.

TABLE 5.1

SHOCK FRONT DATA   DIPOLE WEST/8   WF5/295   30°   SMOKE PUFF GRID 1220   R1 /A780106

PRIMARY FRONT FROM LOWER CHARGE

AMBIENT TEMPERATURE T= 19.72 DEGREES CELSIUS
AMBIENT PRESSURE P= 93.22 KILOPASCALS
RELATIVE HUMIDITY RH= 31.0 PER CENT
VAPOUR PRESSURE VP= 0.71 KILOPASCALS
AMBIENT SPEED OF SOUND C= 343.635 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 7.45 METERS
SEPARATION +2 HS= 7.60 METERS
SACHS SCALING FACTOR S= 8.1051
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL
RFIT=A+B*T+C*LOG(1+T)+D*SQRT(LOG(1+T))
USING WEIGHT=INVERSE OF RADIUS SQUARED

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
3.543	7.849	7.815	-0.035	0.441	0.964	3.357	11.980	1116.862	2.549	4.156	9
3.543	7.699	7.815	0.116	0.441	0.964	3.357	11.980	1116.862	2.549	4.156	8
3.840	8.061	8.151	0.090	0.478	1.006	3.218	10.914	1017.402	2.423	4.046	7
3.840	8.329	8.151	-0.178	0.478	1.006	3.218	10.914	1017.402	2.423	4.046	6
4.137	8.480	8.473	-0.007	0.515	1.045	3.095	10.005	932.743	2.309	3.942	10
4.732	9.103	9.083	-0.020	0.590	1.121	2.885	8.545	796.556	2.115	3.748	11
4.732	9.107	9.083	-0.024	0.590	1.121	2.885	8.545	796.556	2.115	3.748	5
5.326	9.799	9.654	-0.146	0.664	1.191	2.714	7.424	692.072	1.954	3.573	4
5.920	10.116	10.193	0.077	0.738	1.258	2.570	6.539	609.607	1.817	3.415	12
6.514	10.780	10.704	-0.076	0.812	1.321	2.448	5.825	543.032	1.700	3.271	20
6.810	10.921	10.951	0.030	0.849	1.351	2.394	5.518	514.379	1.647	3.204	21
6.810	10.804	10.951	0.147	0.849	1.351	2.394	5.518	514.379	1.647	3.204	19
7.107	11.192	11.192	0.000	0.885	1.381	2.343	5.238	488.285	1.597	3.140	22
7.107	11.155	11.192	0.037	0.885	1.381	2.343	5.238	488.285	1.597	3.140	18
7.700	11.669	11.660	-0.009	0.959	1.439	2.251	4.747	442.564	1.506	3.021	23
7.700	11.557	11.660	0.103	0.959	1.439	2.251	4.747	442.564	1.506	3.021	17
8.590	12.260	12.330	0.070	1.070	1.521	2.134	4.148	386.710	1.388	2.860	16
9.182	12.766	12.758	-0.008	1.144	1.574	2.067	3.819	355.982	1.319	2.765	15
10.958	13.848	13.967	0.119	1.365	1.723	1.904	3.062	285.451	1.149	2.522	33
10.958	13.684	13.967	0.283	1.365	1.723	1.904	3.062	285.451	1.149	2.522	31
10.958	14.374	13.967	-0.407	1.365	1.723	1.904	3.062	285.451	1.149	2.522	29
10.958	14.070	13.967	-0.104	1.365	1.723	1.904	3.062	285.451	1.149	2.522	30
11.254	13.938	14.159	0.221	1.402	1.747	1.881	2.961	276.076	1.125	2.486	34
11.254	13.777	14.159	0.382	1.402	1.747	1.881	2.961	276.076	1.125	2.486	32
11.254	14.801	14.159	-0.642	1.402	1.747	1.881	2.961	276.076	1.125	2.486	28
11.845	14.474	14.537	0.063	1.476	1.794	1.839	2.777	258.889	1.079	2.420	35
13.913	15.814	15.798	-0.016	1.733	1.949	1.716	2.269	211.486	0.944	2.224	44
13.913	15.694	15.798	0.104	1.733	1.949	1.716	2.269	211.486	0.944	2.224	43
13.913	16.037	15.798	-0.239	1.733	1.949	1.716	2.269	211.486	0.944	2.224	42
14.208	15.981	15.971	-0.010	1.770	1.971	1.701	2.210	205.930	0.928	2.200	45
14.208	16.148	15.971	-0.177	1.770	1.971	1.701	2.210	205.930	0.928	2.200	41
14.503	16.042	16.143	0.101	1.807	1.992	1.687	2.153	200.723	0.912	2.176	46
15.093	16.764	16.482	-0.282	1.880	2.034	1.660	2.048	190.925	0.881	2.132	40
15.388	16.527	16.650	0.123	1.917	2.054	1.647	1.999	186.346	0.867	2.111	47
17.450	18.022	17.788	-0.234	2.174	2.195	1.570	1.708	159.222	0.777	1.981	57
17.450	17.846	17.788	-0.057	2.174	2.195	1.570	1.708	159.222	0.777	1.981	56
17.450	17.972	17.788	-0.184	2.174	2.195	1.570	1.708	159.222	0.777	1.981	54
17.450	17.795	17.788	-0.007	2.174	2.195	1.570	1.708	159.222	0.777	1.981	55
18.333	18.428	18.260	-0.167	2.284	2.253	1.542	1.606	149.740	0.744	1.933	59
18.333	18.332	18.260	-0.072	2.284	2.253	1.542	1.606	149.740	0.744	1.933	53

TABLE 5.1 (continued)

18.333	18.185	18.260	0.075	2.284	2.253	1.542	1.606	149.740	0.744	1.933	58
22.738	20.297	20.507	0.210	2.833	2.530	1.434	1.233	114.980	0.614	1.749	70
22.738	20.377	20.507	0.130	2.833	2.530	1.434	1.233	114.980	0.614	1.749	65
22.738	20.129	20.507	0.378	2.833	2.530	1.434	1.233	114.980	0.614	1.749	68
22.738	20.076	20.507	0.431	2.833	2.530	1.434	1.233	114.980	0.614	1.749	67
23.032	20.269	20.651	0.382	2.870	2.548	1.429	1.214	113.217	0.607	1.739	66
23.032	20.154	20.651	0.497	2.870	2.548	1.429	1.214	113.217	0.607	1.739	69
24.789	22.079	21.504	-0.575	3.083	2.653	1.398	1.112	103.678	0.568	1.685	79
24.789	21.983	21.504	-0.478	3.088	2.653	1.398	1.112	103.678	0.568	1.685	78
25.667	22.173	21.924	-0.249	3.198	2.705	1.384	1.067	99.496	0.551	1.661	81
25.959	22.005	22.063	0.057	3.234	2.722	1.379	1.053	98.179	0.545	1.654	80
29.755	24.128	23.829	-0.300	3.707	2.940	1.331	0.900	83.875	0.483	1.569	91
30.630	24.174	24.227	0.053	3.816	2.989	1.322	0.871	81.187	0.471	1.553	92
30.921	24.252	24.359	0.108	3.852	3.005	1.319	0.862	80.333	0.467	1.548	93
33.831	25.599	25.664	0.065	4.215	3.166	1.292	0.781	72.792	0.432	1.502	104
33.831	25.638	25.664	0.026	4.215	3.166	1.292	0.781	72.792	0.432	1.502	103
37.313	27.307	27.194	-0.113	4.649	3.355	1.266	0.704	65.661	0.397	1.457	116
			0.225 RMS								

T IS TIME OF ARRIVAL AND R IS RADIAL PUFF POSITION COMPUTED ASSUMING SHOCK FRONT SHAPE IS SPHERICAL.
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED,
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.2

SHOCK FRONT DATA   DIPOLE WEST/8   WF5/295 30°   SMOKE PUFF GRID 1220   R2 /A780106

PRIMARY FRONT FROM UPPER CHARGE

AMBIENT TEMPERATURE T= 19.72 DEGREES CELSIUS
AMBIENT PRESSURE P= 93.22 KILOPASCALS
RELATIVE HUMIDITY RH= 31.0 PER CENT
VAPOUR PRESSURE VP= 0.71 KILOPASCALS
AMBIENT SPEED OF SOUND C= 343.635 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 7.45 METERS
SEPARATION *2 HS= 7.60 METERS
SACHS SCALING FACTOR S= 8.1051
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL
RFIT=A+B*T+C*LOG(1+T)+D*SQRT(LOG(1+T))
USING WEIGHT=INVERSE OF RADIUS SQUARED

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
4.732	9.372	9.389	0.017	0.590	1.158	2.330	5.169	481.846	1.584	3.124	1
5.920	10.352	10.301	-0.050	0.738	1.271	2.156	4.254	396.603	1.410	2.890	2
8.293	11.894	11.987	0.093	1.033	1.479	2.009	3.542	330.170	1.259	2.680	13
9.478	12.852	12.800	-0.052	1.181	1.579	1.987	3.441	320.815	1.237	2.648	14
12.141	14.643	14.618	-0.025	1.513	1.804	1.998	3.491	325.445	1.248	2.664	25
15.093	16.657	16.673	0.015	1.880	2.057	2.057	3.768	351.226	1.309	2.749	37
			0.050 RMS								

T IS TIME OF ARRIVAL AND R IS RADIAL PUFF POSITION COMPUTED ASSUMING SHOCK FRONT SHAPE IS SPHERICAL.
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED.
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.3

SHOCK FRONT DATA   DIPOLE WEST/8   WF5/295   30°   SMOKE PUFF GRID 1220   R4 /A780106

MACH STEM BELOW INTERACTION PLANE

AMBIENT TEMPERATURE T= 19.72 DEGREES CELSIUS
AMBIENT PRESSURE P= 93.22 KILOPASCALS
RELATIVE HUMIDITY RH= 31.0 PER CENT
VAPOUR PRESSURE VP= 0.71 KILOPASCALS
AMBIENT SPEED OF SOUND C= 343.635 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 7.45 METERS
SEPARATION 42 HS= 7.60 METERS
SACHS SCALING FACTOR S= 8.1051
SCALING TO CHARGE WEIGHT W0=   1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL
RFIT=A+B*T+C*LOG(1+T)+D*SQRT(LOG(1+T))
USING WEIGHT=INVERSE OF RADIUS SQUARED

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
6.514	8.059	8.053	-0.006	0.812	0.994	3.360	12.003	1118.961	2.552	4.158	3
12.732	13.769	13.900	0.131	1.586	1.715	2.302	5.015	467.547	1.556	3.087	27
15.093	15.810	15.682	-0.128	1.880	1.935	2.099	3.973	370.340	1.352	2.810	39
18.039	17.871	17.707	-0.164	2.248	2.185	1.911	3.096	288.586	1.157	2.533	51
18.333	18.012	17.899	-0.113	2.284	2.208	1.896	3.026	282.052	1.140	2.509	52
22.738	20.259	20.614	0.355	2.833	2.543	1.704	2.221	207.027	0.931	2.204	64
22.738	20.152	20.614	0.462	2.833	2.543	1.704	2.221	207.027	0.931	2.204	63
24.496	22.279	21.625	-0.654	3.052	2.668	1.645	1.992	185.659	0.865	2.107	77
24.496	22.097	21.625	-0.471	3.052	2.668	1.645	1.992	185.659	0.865	2.107	76
26.252	21.948	22.602	0.654	3.271	2.789	1.594	1.798	167.618	0.806	2.022	75
30.047	24.093	24.619	0.526	3.744	3.037	1.503	1.469	136.910	0.698	1.867	87
30.338	24.233	24.769	0.536	3.780	3.056	1.497	1.447	134.923	0.691	1.857	88
30.630	24.689	24.919	0.229	3.816	3.074	1.491	1.426	132.980	0.683	1.846	90
30.630	24.489	24.919	0.430	3.816	3.074	1.491	1.426	132.930	0.683	1.846	89
31.503	26.167	25.364	-0.803	3.925	3.129	1.474	1.367	127.408	0.662	1.817	102
31.503	25.674	25.364	-0.310	3.925	3.129	1.474	1.367	127.408	0.662	1.817	99
31.795	25.927	25.511	-0.416	3.961	3.147	1.468	1.348	125.632	0.656	1.807	101
32.668	25.828	25.949	0.121	4.070	3.202	1.452	1.293	120.530	0.636	1.780	100
34.992	27.683	27.093	-0.590	4.360	3.343	1.413	1.163	108.397	0.588	1.712	114
34.992	27.029	27.093	0.064	4.360	3.343	1.413	1.163	108.397	0.588	1.712	111
34.992	27.235	27.093	-0.142	4.360	3.343	1.413	1.163	108.397	0.588	1.712	112
35.573	27.415	27.374	-0.041	4.432	3.377	1.404	1.133	105.659	0.577	1.697	113
36.733	27.962	27.930	-0.032	4.577	3.446	1.387	1.078	100.494	0.555	1.667	115
39.051	29.358	29.022	-0.335	4.865	3.581	1.356	0.979	91.260	0.516	1.613	127
39.051	28.650	29.022	0.372	4.865	3.581	1.356	0.979	91.260	0.516	1.613	123
39.051	28.760	29.022	0.262	4.865	3.581	1.356	0.979	91.260	0.516	1.613	124
39.051	28.939	29.022	0.083	4.865	3.581	1.356	0.979	91.260	0.516	1.613	125
39.051	29.066	29.022	-0.043	4.865	3.581	1.356	0.979	91.260	0.516	1.613	126
40.208	30.296	29.559	-0.738	5.010	3.647	1.342	0.935	87.120	0.497	1.569	137
40.786	30.478	29.825	-0.653	5.082	3.680	1.335	0.913	85.157	0.489	1.577	138
41.364	30.208	30.089	-0.118	5.154	3.712	1.329	0.893	83.259	0.480	1.566	136
41.364	30.130	30.089	-0.040	5.154	3.712	1.329	0.893	83.259	0.480	1.566	135
41.942	30.853	30.352	-0.501	5.226	3.745	1.322	0.873	81.425	0.472	1.555	139
45.402	32.166	31.904	-0.262	5.657	3.936	1.288	0.768	71.592	0.426	1.494	150
45.402	31.605	31.904	0.299	5.657	3.936	1.288	0.768	71.592	0.426	1.494	147
45.402	31.745	31.904	0.158	5.657	3.936	1.288	0.768	71.592	0.426	1.494	148
46.554	32.475	32.411	-0.063	5.800	3.999	1.277	0.737	68.705	0.412	1.476	151
46.554	31.960	32.411	0.451	5.800	3.999	1.277	0.737	68.705	0.412	1.476	149
49.428	33.984	33.661	-0.323	6.158	4.153	1.254	0.667	62.195	0.380	1.435	163
49.428	33.195	33.661	0.466	6.158	4.153	1.254	0.667	62.195	0.380	1.435	159

TABLE 5.3 (continued)

49.428	33.289	33.661	0.372	6.158	4.153	1.254	0.667	62.195	0.380	1.435	160
49.428	33.537	33.661	0.124	6.158	4.153	1.254	0.667	62.195	0.380	1.435	161
49.428	33.650	33.661	0.011	6.158	4.153	1.254	0.667	62.195	0.380	1.435	162
54.014	35.596	35.611	0.015	6.730	4.394	1.221	0.574	53.506	0.336	1.379	175
54.014	34.866	35.611	0.744	6.730	4.394	1.221	0.574	53.506	0.336	1.379	171
54.014	35.023	35.611	0.587	6.730	4.394	1.221	0.574	53.506	0.336	1.379	172
54.014	35.136	35.611	0.474	6.730	4.394	1.221	0.574	53.506	0.336	1.379	173
54.014	35.193	35.611	0.417	6.730	4.394	1.221	0.574	53.506	0.336	1.379	174
55.158	36.975	36.089	-0.886	6.872	4.453	1.214	0.554	51.607	0.326	1.366	187
55.158	36.207	36.089	-0.118	6.872	4.453	1.214	0.554	51.607	0.326	1.366	183
55.158	36.360	36.089	-0.270	6.872	4.453	1.214	0.554	51.607	0.326	1.366	184
55.158	36.471	36.089	-0.382	6.872	4.453	1.214	0.554	51.607	0.326	1.365	185
55.158	36.642	36.089	-0.552	6.872	4.453	1.214	0.554	51.607	0.326	1.366	186
60.010	38.379	38.091	-0.288	7.477	4.700	1.187	0.477	44.510	0.287	1.319	199
60.010	37.897	38.091	0.194	7.477	4.700	1.187	0.477	44.510	0.287	1.319	195
60.010	37.949	38.091	0.142	7.477	4.700	1.187	0.477	44.510	0.287	1.319	196
60.010	38.027	38.091	0.064	7.477	4.700	1.187	0.477	44.510	0.287	1.319	197
60.010	38.223	38.091	-0.133	7.477	4.700	1.187	0.477	44.510	0.287	1.319	198
65.697	39.790	40.384	0.594	8.185	4.983	1.161	0.405	37.773	0.249	1.274	210
65.697	39.475	40.384	0.909	8.185	4.983	1.161	0.405	37.773	0.249	1.274	207
65.697	39.601	40.384	0.783	8.185	4.983	1.161	0.405	37.773	0.249	1.274	208
65.697	39.687	40.384	0.697	8.185	4.983	1.161	0.405	37.773	0.249	1.274	209
65.981	40.241	40.497	0.256	8.221	4.997	1.160	0.402	37.474	0.248	1.272	211
68.250	41.557	41.398	-0.159	8.503	5.108	1.150	0.377	35.186	0.234	1.256	223
68.250	41.027	41.398	0.371	8.503	5.108	1.150	0.377	35.186	0.234	1.256	219
68.250	40.894	41.398	0.504	8.503	5.108	1.150	0.377	35.186	0.234	1.256	220
68.533	41.216	41.509	0.293	8.539	5.121	1.149	0.375	34.913	0.233	1.254	221
68.533	41.437	41.509	0.072	8.539	5.121	1.149	0.375	34.913	0.233	1.254	222
69.100	43.055	41.733	-1.322	8.609	5.149	1.147	0.369	34.376	0.230	1.250	235
69.100	42.475	41.733	-0.743	8.609	5.149	1.147	0.369	34.376	0.230	1.250	231
69.100	42.774	41.733	-1.041	8.609	5.149	1.147	0.369	34.376	0.230	1.250	234
69.383	42.510	41.845	-0.666	8.644	5.163	1.146	0.366	34.111	0.228	1.248	232
69.383	42.524	41.845	-0.679	8.644	5.163	1.146	0.366	34.111	0.228	1.248	233
			0.467 RMS								

T IS TIME OF ARRIVAL AND R IS RADIAL PUFF POSITION COMPUTED ASSUMING SHOCK FRONT SHAPE IS SPHERICAL.
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED.
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.4

SHOCK FRONT DATA   DIPOLE WEST/8   WF5/295 30°   SMOKE PUFF GRID 1220   R5 /A780106

MACH STEM ABOVE INTERACTION PLANE

AMBIENT TEMPERATURE T= 19.72 DEGREES CELSIUS
AMBIENT PRESSURE P= 93.22 KILOPASCALS
RELATIVE HUMIDITY RH= 31.0 PER CENT
VAPOUR PRESSURE VP= 0.71 KILOPASCALS
AMBIENT SPEED OF SOUND C= 343.635 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 7.45 METERS
SEPARATION ÷2 HS= 7.60 METERS
SACHS SCALING FACTOR S= 8.1051
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL
RFIT=A+B*T+C*LOG(1+T)+D*SQRT(LOG(1+T))
USING WEIGHT=INVERSE OF RADIUS SQUARED

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
12.732	13.801	13.812	0.011	1.586	1.704	2.326	5.148	479.899	1.581	3.119	26
15.093	15.699	15.605	-0.094	1.880	1.925	2.105	4.001	372.963	1.358	2.818	38
18.333	17.869	17.820	-0.049	2.284	2.199	1.886	2.985	278.277	1.130	2.495	50
18.922	18.054	18.198	0.144	2.357	2.245	1.854	2.845	265.238	1.096	2.445	49
22.738	20.310	20.513	0.202	2.833	2.531	1.685	2.148	200.201	0.910	2.174	62
22.738	20.247	20.513	0.265	2.833	2.531	1.685	2.148	200.201	0.910	2.174	61
24.496	22.003	21.512	-0.491	3.052	2.654	1.625	1.914	178.472	0.841	2.074	73
25.082	21.934	21.837	-0.097	3.125	2.694	1.607	1.846	172.070	0.820	2.043	74
29.755	24.184	24.316	0.132	3.707	3.000	1.488	1.415	131.955	0.680	1.841	85
30.047	24.145	24.465	0.320	3.744	3.018	1.482	1.394	129.966	0.672	1.830	86
31.795	25.666	25.344	-0.322	3.961	3.127	1.447	1.276	118.994	0.630	1.771	97
32.958	25.703	25.919	0.216	4.106	3.198	1.426	1.207	112.498	0.604	1.735	98
35.573	27.137	27.181	0.044	4.432	3.354	1.385	1.071	99.844	0.552	1.663	110
35.573	27.125	27.181	0.056	4.432	3.354	1.385	1.071	99.844	0.552	1.663	109
39.051	28.666	28.808	0.143	4.865	3.554	1.339	0.926	86.293	0.494	1.584	122
39.051	28.631	28.808	0.177	4.865	3.554	1.339	0.926	86.293	0.494	1.584	121
39.630	30.112	29.074	-1.038	4.938	3.587	1.332	0.905	84.332	0.485	1.572	134
40.208	30.076	29.338	-0.739	5.010	3.620	1.326	0.884	82.443	0.476	1.561	133
45.402	31.684	31.658	-0.027	5.657	3.906	1.276	0.732	68.206	0.410	1.473	146
45.978	31.808	31.910	0.102	5.729	3.937	1.271	0.717	66.880	0.403	1.465	145
49.428	33.140	33.400	0.260	6.158	4.121	1.245	0.641	59.773	0.368	1.420	158
50.576	33.347	33.890	0.543	6.301	4.181	1.237	0.619	57.685	0.357	1.406	157
54.014	34.867	35.339	0.472	6.730	4.360	1.216	0.559	52.120	0.328	1.370	170
54.014	34.985	35.339	0.354	6.730	4.360	1.216	0.559	52.120	0.328	1.370	169
55.730	36.177	36.053	-0.124	6.943	4.448	1.207	0.533	49.677	0.315	1.354	182
55.730	36.419	36.053	-0.366	6.943	4.448	1.207	0.533	49.677	0.315	1.354	181
60.010	37.957	37.813	-0.144	7.477	4.665	1.187	0.476	44.374	0.287	1.318	194
60.010	37.975	37.813	-0.162	7.477	4.665	1.187	0.476	44.374	0.287	1.318	193
65.697	39.566	40.110	0.544	8.185	4.949	1.164	0.415	38.716	0.255	1.280	206
65.697	39.524	40.110	0.585	8.185	4.949	1.164	0.415	38.716	0.255	1.280	205
68.250	41.010	41.127	0.117	8.503	5.074	1.156	0.392	36.581	0.242	1.265	218
68.250	40.972	41.127	0.155	8.503	5.074	1.156	0.392	36.581	0.242	1.265	217
69.100	42.233	41.464	-0.769	8.609	5.116	1.153	0.385	35.917	0.239	1.261	230
69.383	42.314	41.576	-0.738	8.644	5.130	1.152	0.383	35.700	0.237	1.259	229
			0.386 RMS								

T IS TIME OF ARRIVAL AND R IS RADIAL PUFF POSITION COMPUTED ASSUMING SHOCK FRONT SHAPE IS SPHERICAL.
SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE.
PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED,
WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND
AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P),
WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.)
SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS).
VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 5.5

SHOCK FRONT DATA   DIPOLE WEST/8   WF5/295   30°   SMOKE PUFF GRID 1220   R3 /A780106

MACH STEM AT GROUND SURFACE

AMBIENT TEMPERATURE T= 19.72 DEGREES CELSIUS
AMBIENT PRESSURE P= 93.22 KILOPASCALS
RELATIVE HUMIDITY RH= 31.0 PER CENT
VAPOUR PRESSURE VP= 0.71 KILOPASCALS
AMBIENT SPEED OF SOUND C= 343.635 METERS/SECOND
CHARGE WEIGHT W= 489.9 KILOGRAMS
CHARGE HEIGHT H= 7.45 METERS
SEPARATION ∗2 HS= 7.60 METERS
SACHS SCALING FACTOR S= 8.1051
SCALING TO CHARGE WEIGHT WO= 1.0 KILOGRAMS

SHOCK FRONT DATA COMPUTED FROM PARTICLE TRAJECTORY TIMES OF ARRIVAL
RFIT=A+B*T+C*LOG(1+T)+D*SQRT(LOG(1+T))
USING WEIGHT=INVERSE OF RADIUS SQUARED

T-OBS MSEC	R-OBS METERS	R-FIT METERS	DIFFERENCE METERS	T-SCAL MSEC	R-SCAL METERS	SHOCK VELOCITY	PRESSURE RATIO	PRESSURE KPA	PARTICLE VELOCITY	DENSITY RATIO	PUFF NUMBER
15.093	14.736	15.009	0.273	1.880	1.852	2.191	4.433	413.278	1.445	2.939	36
15.683	15.746	15.448	-0.298	1.954	1.906	2.142	4.188	390.460	1.396	2.872	48
18.922	17.891	17.705	-0.186	2.357	2.184	1.927	3.166	295.181	1.174	2.557	60
22.738	19.997	20.110	0.113	2.833	2.481	1.750	2.404	224.132	0.982	2.278	72
22.738	20.179	20.110	-0.069	2.833	2.481	1.750	2.404	224.132	0.982	2.278	71
26.252	22.123	22.147	0.024	3.271	2.732	1.631	1.938	180.708	0.849	2.084	84
26.836	22.384	22.473	0.089	3.344	2.773	1.615	1.876	174.850	0.830	2.057	82
26.836	22.329	22.473	0.144	3.344	2.773	1.615	1.876	174.850	0.830	2.057	83
30.338	24.214	24.363	0.149	3.780	3.006	1.529	1.562	145.612	0.730	1.912	96
30.630	24.350	24.516	0.165	3.816	3.025	1.523	1.540	143.557	0.722	1.902	94
30.630	24.420	24.516	0.095	3.816	3.025	1.523	1.540	143.557	0.722	1.902	95
32.958	25.797	25.716	-0.081	4.106	3.173	1.478	1.381	128.783	0.668	1.824	108
33.249	25.842	25.863	0.022	4.143	3.191	1.473	1.364	127.123	0.661	1.815	107
33.831	26.276	26.156	-0.120	4.215	3.227	1.463	1.329	123.913	0.649	1.798	105
33.831	26.112	26.156	0.044	4.215	3.227	1.463	1.329	123.913	0.649	1.798	106
35.573	27.197	27.024	-0.174	4.432	3.334	1.435	1.235	115.091	0.615	1.750	120
36.733	27.457	27.592	0.135	4.577	3.404	1.418	1.178	109.808	0.594	1.720	119
36.733	27.493	27.592	0.100	4.577	3.404	1.418	1.178	109.808	0.594	1.720	118
37.313	27.684	27.874	0.190	4.649	3.439	1.410	1.151	107.326	0.583	1.706	117
39.051	28.849	28.709	-0.141	4.865	3.542	1.387	1.078	100.454	0.555	1.657	132
39.051	28.962	28.709	-0.253	4.865	3.542	1.387	1.078	100.454	0.555	1.657	131
40.208	29.433	29.257	-0.176	5.010	3.610	1.373	1.033	96.301	0.537	1.643	128
40.208	29.109	29.257	0.149	5.010	3.610	1.373	1.033	96.301	0.537	1.643	130
40.208	29.189	29.257	0.069	5.010	3.610	1.373	1.033	96.301	0.537	1.643	129
41.942	30.143	30.070	-0.073	5.226	3.710	1.354	0.972	90.630	0.513	1.610	144
41.942	30.223	30.070	-0.153	5.226	3.710	1.354	0.972	90.630	0.513	1.610	143
41.942	30.355	30.070	-0.285	5.226	3.710	1.354	0.972	90.630	0.513	1.610	142
43.673	31.014	30.870	-0.144	5.441	3.809	1.337	0.918	85.546	0.490	1.579	140
43.673	30.689	30.870	0.181	5.441	3.809	1.337	0.918	85.546	0.490	1.579	141
45.402	31.998	31.660	-0.339	5.657	3.906	1.321	0.869	80.969	0.470	1.552	154
45.978	31.850	31.920	0.070	5.729	3.938	1.316	0.853	79.545	0.463	1.543	155
45.978	32.172	31.920	-0.251	5.729	3.938	1.316	0.853	79.545	0.463	1.543	153
45.978	32.394	31.920	-0.473	5.729	3.938	1.316	0.853	79.545	0.463	1.543	152
49.428	33.400	33.464	0.064	6.158	4.129	1.289	0.771	71.911	0.427	1.496	168
49.428	33.379	33.464	0.085	6.158	4.129	1.289	0.771	71.911	0.427	1.496	167
49.428	33.932	33.464	-0.468	6.158	4.129	1.289	0.771	71.911	0.427	1.496	164
49.428	33.743	33.464	-0.279	6.158	4.129	1.289	0.771	71.911	0.427	1.496	165
49.428	33.549	33.464	-0.085	6.158	4.129	1.289	0.771	71.911	0.427	1.496	166
51.150	32.678	34.223	1.545	6.373	4.222	1.277	0.736	68.603	0.412	1.476	156
54.014	35.004	35.471	0.467	6.730	4.376	1.259	0.683	63.709	0.388	1.445	180

TABLE 5.5 (continued)

54.014	35.596	35.471	-0.125	6.730	4.376	1.259	0.683	63.709	0.388	1.445	176
54.014	35.260	35.471	0.211	6.730	4.376	1.259	0.683	63.709	0.388	1.445	177
54.014	35.061	35.471	0.410	6.730	4.376	1.259	0.683	63.709	0.388	1.445	178
54.014	35.068	35.471	0.403	6.730	4.376	1.259	0.683	63.709	0.388	1.445	179
55.158	36.696	35.965	-0.732	6.872	4.437	1.253	0.664	61.942	0.379	1.433	189
55.730	36.488	36.211	-0.277	6.943	4.468	1.250	0.655	61.095	0.375	1.428	192
55.730	36.861	36.211	-0.650	6.943	4.468	1.250	0.655	61.095	0.375	1.428	188
56.301	36.555	36.456	-0.099	7.015	4.498	1.247	0.647	60.272	0.370	1.423	190
56.301	36.444	36.456	0.012	7.015	4.498	1.247	0.647	60.272	0.370	1.423	191
60.010	38.012	38.033	0.021	7.477	4.692	1.229	0.595	55.430	0.346	1.391	204
60.010	38.413	38.033	-0.380	7.477	4.692	1.229	0.595	55.430	0.346	1.391	200
60.010	38.164	38.033	-0.132	7.477	4.692	1.229	0.595	55.430	0.346	1.391	201
60.010	38.076	38.033	-0.043	7.477	4.692	1.229	0.595	55.430	0.346	1.391	202
60.010	38.044	38.033	-0.012	7.477	4.692	1.229	0.595	55.430	0.346	1.391	203
65.697	39.574	40.411	0.837	8.185	4.986	1.206	0.530	49.401	0.314	1.352	216
65.697	40.068	40.411	0.343	8.185	4.986	1.206	0.530	49.401	0.314	1.352	212
65.697	39.840	40.411	0.571	8.185	4.986	1.206	0.530	49.401	0.314	1.352	213
65.697	39.659	40.411	0.752	8.185	4.986	1.206	0.530	49.401	0.314	1.352	215
65.981	39.717	40.528	0.812	8.221	5.000	1.205	0.527	49.136	0.312	1.350	214
68.250	41.079	41.465	0.386	8.503	5.116	1.197	0.506	47.130	0.302	1.337	228
68.250	41.569	41.465	-0.104	8.503	5.116	1.197	0.506	47.130	0.302	1.337	224
68.250	41.462	41.465	0.003	8.503	5.116	1.197	0.506	47.130	0.302	1.337	225
68.250	41.229	41.465	0.236	8.503	5.116	1.197	0.506	47.130	0.302	1.337	226
68.250	41.085	41.465	0.380	8.503	5.116	1.197	0.506	47.130	0.302	1.337	227
69.100	42.464	41.814	-0.650	8.609	5.159	1.195	0.498	46.425	0.298	1.332	240
69.100	42.872	41.814	-1.058	8.609	5.159	1.195	0.498	46.425	0.298	1.332	236
69.100	42.786	41.814	-0.972	8.609	5.159	1.195	0.498	46.425	0.298	1.332	237
69.100	42.367	41.814	-0.553	8.609	5.159	1.195	0.498	46.425	0.298	1.332	239
69.949	42.505	42.162	-0.343	8.715	5.202	1.192	0.491	45.743	0.294	1.328	238
			0.404 RMS								

T IS TIME OF ARRIVAL AND R IS RADIAL PUFF POSITION COMPUTED ASSUMING SHOCK FRONT SHAPE IS SPHERICAL. SHOCK AND PARTICLE VELOCITIES ARE EXPRESSED IN MACH UNITS, RELATIVE TO THE AMBIENT SOUND SPEED C ABOVE. PRESSURE IS PEAK OVERPRESSURE RATIO (PMAX-P)/P, AND PEAK OVERPRESSURE (PMAX-P) IN KILOPASCALS OBSERVED, WHERE P IS AMBIENT PRESSURE. DENSITY IS EXPRESSED AS A RATIO, RELATIVE TO THE AMBIENT DENSITY D.

SCALED TIME= OBSERVED TIME MULTIPLIED BY (C/CO)/S, WHERE CO= 340.292 METERS/SECOND AND SCALED DISTANCE= OBSERVED DISTANCE DIVIDED BY S= CUBE ROOT OF (W/WO)*(PO/P), WHERE PO= 101.325 KILOPASCALS. (W, WO, AND P ARE DEFINED ABOVE.) SCALED EVENT= STANDARD CHARGE WO IN ATMOSPHERE WHERE CO AND PO ARE AMBIENT (TO= 15 DEGREES CELSIUS). VELOCITY, PRESSURE, AND DENSITY, EXPRESSED AS RATIOS, ARE INVARIANT UNDER SCALING.

TABLE 7.1

VELOCITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 1.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.177	2.100	0.84	-0.56	1.009	1.367	2
1.128	1.951	1.25	-0.42	1.322	1.408	2
1.082	1.834	1.27	0.28	1.301	1.082	4
1.173	1.732	1.37	0.56	1.478	1.427	1
1.203	1.552	1.27	0.47	1.355	1.359	1
1.264	1.098	0.99	0.12	0.999	1.276	1
1.287	0.856	1.02	-0.05	1.021	1.288	1
1.258	0.616	0.87	-0.24	0.906	1.294	1
1.186	0.398	0.87	-0.54	1.025	1.295	1

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.104	0.202	1.26	-0.43	1.329	1.317	1
1.065	0.045	1.28	-0.24	1.302	1.378	1
1.352	1.403	0.87	0.39	0.959	1.436	1
1.397	1.243	1.29	0.15	1.296	1.434	1
1.410	1.060	1.45	0.12	1.458	1.417	1
1.425	0.867	1.31	-0.09	1.311	1.426	1
1.403	0.683	1.27	-0.46	1.349	1.422	1
1.362	0.475	1.23	-0.30	1.261	1.433	1
1.309	0.290	0.75	-0.56	0.931	1.452	1

PARTICLE VELOCITIES AT SCALED TIME= 2.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.483	2.094	0.46	0.13	0.480	1.640	2
1.429	1.939	0.43	0.02	0.426	1.431	5
1.344	1.867	0.34	-0.04	0.345	1.344	5
1.503	1.732	0.60	-0.13	0.612	1.508	4
1.556	1.575	0.78	-0.13	0.788	1.689	1
1.493	1.094	0.67	-0.21	0.699	1.493	1
1.496	0.845	0.67	-0.03	0.671	1.498	1
1.498	0.590	0.56	0.25	0.615	1.534	1
1.459	0.387	0.60	0.32	0.680	1.562	1
1.424	0.220	0.49	0.26	0.550	1.537	1
1.684	2.132	0.75	0.13	0.759	1.809	2
1.645	1.926	0.72	-0.09	0.723	1.646	5
1.642	1.825	0.79	0.12	0.796	1.642	4
1.697	1.672	0.88	-0.05	0.881	1.856	1
1.665	1.292	0.67	-0.10	0.680	1.706	1
1.700	1.079	0.59	-0.01	0.592	1.708	1
1.717	0.852	0.41	-0.06	0.419	1.718	1
1.688	0.630	0.61	0.02	0.612	1.713	1
1.681	0.394	0.73	0.11	0.735	1.761	1
1.539	0.231	0.80	0.08	0.800	1.777	1
1.865	2.151	0.87	0.01	0.874	1.973	2
1.905	2.028	1.22	0.20	1.233	1.913	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.889	1.815	1.06	-0.03	1.062	1.889	4
1.827	1.646	0.77	0.03	0.767	1.966	1
1.822	1.469	0.66	-0.07	0.660	1.903	1
1.885	1.284	0.75	0.08	0.750	1.920	1
1.887	1.084	0.56	0.03	0.562	1.894	1
1.896	0.878	0.64	-0.03	0.643	1.896	1
1.899	0.666	0.66	-0.10	0.665	1.916	1
1.864	0.451	0.79	-0.08	0.797	1.922	1
1.840	0.259	0.94	-0.07	0.947	1.955	1
1.851	0.106	0.92	-0.02	0.917	1.854	3
1.987	2.142	0.87	-0.11	0.881	2.092	2
1.994	1.975	1.39	0.11	1.390	1.998	5
2.001	1.749	1.26	-0.01	1.260	2.004	4
1.994	1.585	0.82	0.04	0.824	2.102	1
1.990	1.421	0.72	0.16	0.738	2.052	1
2.021	1.251	0.70	0.11	0.709	2.048	1
2.029	1.033	0.81	-0.00	0.808	2.032	1
2.028	0.847	0.81	-0.04	0.812	2.029	1
2.015	0.654	0.67	-0.17	0.688	2.032	1
1.992	0.464	0.88	-0.21	0.906	2.043	1
1.963	0.284	0.85	-0.17	0.865	2.064	1
1.959	0.122	1.26	0.02	1.262	1.963	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.2

VELOCITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 3.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.542	2.131	-0.00	0.07	0.067	1.679	2
1.465	1.942	-0.02	0.06	0.061	1.467	5
1.393	1.866	0.12	0.06	0.139	1.393	5
1.598	1.720	0.08	0.08	0.109	1.604	4
1.694	1.562	0.12	0.13	0.175	1.802	1
1.597	1.084	0.37	0.03	0.371	1.705	1
1.727	0.854	0.40	0.05	0.405	1.728	1
1.679	0.600	0.35	-0.08	0.356	1.709	1
1.536	0.402	0.37	-0.21	0.423	1.668	1
1.503	0.238	0.16	-0.20	0.257	1.650	1
1.834	2.177	0.19	0.03	0.189	1.936	2
1.759	1.920	-0.05	0.12	0.132	1.760	5
1.738	1.864	0.19	0.10	0.211	1.788	5
1.859	1.668	0.20	0.07	0.214	1.868	4
1.830	1.272	0.34	0.07	0.346	1.863	1
1.903	1.068	0.59	-0.02	0.583	1.909	1
1.925	0.854	0.61	0.04	0.607	1.926	1
1.878	0.641	0.51	-0.00	0.509	1.899	1
1.834	0.431	0.32	-0.04	0.324	1.898	1
1.792	0.258	0.22	-0.02	0.218	1.910	1
2.078	2.173	0.39	0.03	0.392	2.169	2
2.196	2.067	0.60	0.07	0.608	2.206	5
2.130	1.801	0.49	-0.04	0.496	2.131	4
1.998	1.650	0.24	0.02	0.241	2.009	4
1.971	1.435	0.23	-0.06	0.239	2.038	1
2.086	1.259	0.47	-0.10	0.482	2.115	1
2.057	1.072	0.53	-0.05	0.538	2.063	1
2.065	0.869	0.66	0.02	0.665	2.066	1
2.095	0.672	0.53	0.07	0.531	2.100	1
2.074	0.473	0.48	0.09	0.486	2.121	1
2.075	0.274	0.42	0.05	0.423	2.173	1
2.132	0.123	0.53	0.03	0.533	2.135	3
2.237	2.158	0.60	0.07	0.602	2.258	5
2.308	2.003	0.68	0.05	0.677	2.313	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.317	1.724	0.68	-0.07	0.683	2.321	4
2.203	1.562	0.42	-0.10	0.437	2.223	4
2.197	1.413	0.47	-0.08	0.474	2.252	1
2.220	1.238	0.50	-0.10	0.512	2.243	1
2.203	1.030	0.49	-0.04	0.492	2.205	1
2.206	0.838	0.25	-0.02	0.247	2.208	1
2.200	0.651	0.52	0.08	0.529	2.217	1
2.220	0.461	0.51	0.09	0.518	2.266	1
2.204	0.279	0.52	0.04	0.525	2.222	3
2.291	0.134	0.69	0.03	0.695	2.295	3
2.410	2.168	0.41	0.27	0.493	2.430	5
2.433	1.963	0.76	0.06	0.761	2.436	5
2.441	1.765	0.80	-0.01	0.799	2.443	4
2.385	1.546	0.58	0.02	0.580	2.406	4
2.382	1.403	0.61	-0.09	0.613	2.430	1
2.376	1.229	0.54	-0.10	0.544	2.395	1
2.350	1.014	0.47	-0.04	0.469	2.352	1
2.366	0.845	0.48	0.01	0.477	2.367	1
2.362	0.657	0.52	0.05	0.523	2.377	1
2.368	0.457	0.55	0.10	0.660	2.411	1
2.369	0.298	0.63	0.05	0.629	2.388	3
2.408	0.166	0.78	-0.02	0.778	2.414	3
2.525	2.147	0.75	0.03	0.747	2.541	5
2.547	1.981	0.77	0.01	0.766	2.550	5
2.541	1.787	0.93	-0.06	0.933	2.542	4
2.543	1.584	0.94	-0.14	0.955	2.557	4
2.528	1.398	0.97	-0.10	0.980	2.569	4
2.522	1.222	0.83	-0.00	0.826	2.540	1
2.510	1.036	0.61	-0.07	0.612	2.512	1
2.515	0.868	0.56	-0.11	0.573	2.516	1
2.502	0.671	0.61	-0.12	0.622	2.514	1
2.510	0.486	0.70	-0.14	0.713	2.547	1
2.525	0.291	0.88	0.03	0.883	2.542	3
2.521	0.089	0.94	-0.07	0.944	2.523	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.3

VELOCITY FIFLD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780105

PARTICLE VELOCITIES AT SCALED TIME=   4.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
1.371	2.157	0.13	-0.01	0.133	1.977	2
1.941	1.707	0.34	0.15	0.367	1.946	4
1.924	1.302	0.11	0.03	0.111	1.962	1
2.055	1.081	0.25	0.07	0.258	2.061	1
2.064	0.846	0.29	-0.04	0.292	2.065	1
2.012	0.621	0.23	-0.10	0.253	2.034	1
1.945	0.394	0.13	-0.07	0.195	2.015	1
1.892	0.211	0.37	-0.15	0.399	2.011	1
2.152	2.172	0.09	-0.00	0.086	2.240	2
2.345	2.083	0.28	0.03	0.278	2.356	5
2.256	1.789	0.25	-0.01	0.252	2.257	4
2.066	1.666	0.24	0.09	0.259	2.075	4
2.038	1.452	0.21	0.15	0.253	2.106	1
2.229	1.272	0.37	0.15	0.397	2.256	1
2.214	1.072	0.29	0.07	0.303	2.219	1
2.256	0.874	0.38	-0.02	0.380	2.257	1
2.248	0.672	0.36	-0.10	0.376	2.261	1
2.205	0.463	0.30	-0.14	0.327	2.252	1
2.194	0.261	0.29	-0.12	0.314	2.200	3
2.268	0.117	0.62	-0.27	0.676	2.271	3
2.392	2.166	0.31	-0.01	0.314	2.412	5
2.492	2.013	0.37	0.01	0.375	2.496	5
2.487	1.709	0.33	-0.03	0.334	2.491	4
2.304	1.548	0.20	0.05	0.205	2.324	4
2.321	1.406	0.30	0.05	0.302	2.371	1
2.369	1.223	0.37	0.04	0.369	2.388	1
2.383	1.019	0.46	-0.00	0.464	2.385	1
2.410	0.845	0.44	-0.04	0.439	2.411	1
2.369	0.664	0.42	-0.04	0.419	2.383	1
2.362	0.473	0.34	-0.05	0.346	2.404	1
2.328	0.275	0.25	-0.08	0.262	2.344	3
2.466	0.147	0.39	0.05	0.394	2.471	3
2.633	1.967	0.43	-0.01	0.431	2.635	5
2.641	1.757	0.40	-0.05	0.402	2.643	4
2.535	1.390	0.32	-0.00	0.323	2.577	1
2.541	1.196	0.44	-0.05	0.438	2.556	1
2.520	0.999	0.50	-0.03	0.505	2.521	1
2.546	0.845	0.55	-0.02	0.552	2.547	1
2.537	0.671	0.48	-0.00	0.479	2.549	1
2.550	0.495	0.42	-0.00	0.418	2.585	1
2.522	0.306	0.31	-0.03	0.310	2.541	3

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.611	0.180	0.44	0.11	0.454	2.617	3
2.745	2.158	0.55	0.04	0.547	2.761	5
2.772	2.000	0.53	0.06	0.534	2.776	5
2.784	1.790	0.52	0.02	0.522	2.785	4
2.772	1.544	0.48	-0.08	0.488	2.790	4
2.740	1.366	0.40	-0.05	0.406	2.783	4
2.715	1.193	0.41	-0.08	0.421	2.730	1
2.693	1.013	0.49	-0.04	0.489	2.694	1
2.699	0.856	0.51	-0.01	0.512	2.699	1
2.702	0.680	0.52	0.05	0.525	2.712	1
2.709	0.502	0.48	0.07	0.487	2.741	1
2.754	0.320	0.51	0.06	0.516	2.773	3
2.770	0.105	0.55	0.07	0.552	2.772	3
2.912	2.170	0.59	0.08	0.594	2.929	5
2.873	1.975	0.49	0.01	0.493	2.876	5
2.881	1.758	0.63	-0.03	0.628	2.883	4
2.890	1.559	0.56	-0.12	0.573	2.906	4
2.921	1.362	0.72	-0.13	0.729	2.963	4
2.883	1.203	0.58	-0.10	0.587	2.897	1
2.850	1.032	0.51	-0.06	0.513	2.852	1
2.857	0.840	0.54	0.00	0.543	2.858	1
2.857	0.673	0.54	0.04	0.541	2.867	1
2.872	0.494	0.56	0.07	0.566	2.914	3
2.904	0.317	0.59	0.07	0.596	2.921	3
2.903	0.105	0.57	0.01	0.574	2.905	3
3.038	2.178	0.68	0.08	0.682	3.054	5
3.037	1.984	0.64	0.05	0.641	3.039	5
3.053	1.773	0.76	-0.20	0.788	3.054	4
3.044	1.581	0.77	-0.25	0.815	3.057	4
3.049	1.398	0.88	-0.20	0.900	3.083	4
3.025	1.207	0.70	-0.22	0.730	3.094	4
3.015	1.028	0.45	-0.06	0.453	3.017	1
3.009	0.847	0.45	-0.07	0.459	3.010	1
3.011	0.667	0.59	0.06	0.594	3.022	1
3.011	0.480	0.69	0.01	0.695	3.049	3
3.051	0.298	0.76	0.02	0.763	3.066	3
3.043	0.109	0.71	-0.01	0.707	3.045	3
3.159	2.167	0.53	0.00	0.535	3.174	5
3.184	1.779	0.66	-0.02	0.659	3.185	4
3.172	1.407	0.38	-0.10	0.391	3.204	4
3.171	1.219	0.26	-0.12	0.282	3.235	4

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.4

VELOCITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A730106

PARTICLE VELOCITIES AT SCALED TIME= 5.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.459	2.162	0.10	-0.05	0.116	2.478	5
2.563	2.022	0.14	0.08	0.165	2.558	5
2.572	1.713	0.27	0.12	0.292	2.576	4
2.354	1.587	0.10	0.13	0.166	2.370	4
2.409	1.439	0.17	0.12	0.212	2.464	1
2.461	1.255	0.17	0.08	0.187	2.484	1
2.469	1.032	0.12	0.04	0.122	2.472	1
2.519	0.836	0.23	0.01	0.227	2.519	1
2.463	0.631	0.17	-0.08	0.190	2.480	1
2.453	0.434	0.19	-0.13	0.225	2.501	1
2.409	0.236	0.26	-0.10	0.277	2.420	3
2.553	0.132	0.01	-0.27	0.267	2.557	3
2.774	1.969	0.19	0.04	0.189	2.736	5
2.744	1.746	0.25	0.00	0.253	2.746	4
2.625	1.402	0.23	0.10	0.252	2.654	4
2.658	1.208	0.23	0.11	0.253	2.673	1
2.650	1.000	0.21	0.04	0.218	2.651	1
2.689	0.835	0.23	-0.03	0.234	2.691	1
2.664	0.651	0.25	-0.09	0.263	2.678	1
2.665	0.467	0.28	-0.12	0.302	2.705	3
2.611	0.277	0.25	-0.12	0.280	2.626	3
2.732	0.172	0.32	-0.15	0.355	2.738	3
2.896	2.172	0.34	0.05	0.348	2.913	5
2.906	2.015	0.27	0.03	0.273	2.910	5
2.914	1.789	0.27	-0.01	0.271	2.915	4
2.903	1.532	0.31	0.02	0.312	2.921	4
2.852	1.369	0.29	0.06	0.298	2.894	4
2.837	1.188	0.31	0.05	0.318	2.849	1
2.839	1.010	0.36	0.02	0.358	2.840	1
2.853	0.848	0.38	-0.03	0.377	2.854	1
2.844	0.671	0.31	-0.09	0.320	2.854	1
2.842	0.494	0.31	-0.11	0.328	2.885	3
2.897	0.318	0.35	-0.06	0.356	2.915	3
2.914	0.113	0.33	-0.03	0.331	2.916	3
3.070	2.194	0.33	0.06	0.338	3.088	5
3.000	1.972	0.26	0.00	0.260	3.002	5
3.059	1.754	0.42	0.00	0.416	3.060	4
3.050	1.537	0.36	-0.00	0.359	3.066	4
3.110	1.341	0.36	0.00	0.359	3.153	4
3.055	1.189	0.41	0.02	0.414	3.128	4
3.016	1.024	0.43	0.02	0.429	3.018	1
3.022	0.837	0.41	-0.02	0.409	3.023	1
3.022	0.673	0.40	-0.04	0.398	3.032	1
3.022	0.499	0.35	-0.05	0.350	3.063	3
3.060	0.326	0.37	-0.03	0.368	3.078	3
3.055	0.105	0.35	-0.02	0.351	3.056	3

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.222	2.203	0.40	0.06	0.404	3.241	5
3.201	1.988	0.36	0.00	0.358	3.203	5
3.207	1.731	0.31	-0.04	0.314	3.209	4
3.218	1.531	0.35	-0.06	0.354	3.234	4
3.245	1.361	0.39	-0.03	0.394	3.283	4
3.214	1.169	0.45	-0.02	0.448	3.287	4
3.185	1.018	0.49	-0.00	0.489	3.187	1
3.177	0.841	0.48	0.00	0.476	3.178	1
3.187	0.670	0.44	-0.03	0.439	3.257	3
3.198	0.488	0.44	0.01	0.435	3.235	3
3.239	0.316	0.44	0.03	0.439	3.254	3
3.216	0.105	0.38	-0.01	0.379	3.218	3
3.320	2.177	0.41	0.05	0.408	3.335	5
3.326	1.964	0.40	-0.01	0.398	3.328	5
3.364	1.767	0.43	-0.03	0.426	3.366	4
3.376	1.564	0.45	-0.06	0.450	3.389	4
3.320	1.385	0.45	-0.02	0.451	3.353	4
3.310	1.196	0.48	-0.02	0.480	3.375	4
3.304	1.013	0.52	-0.01	0.520	3.410	4
3.296	0.830	0.52	-0.00	0.518	3.298	1
3.312	0.675	0.51	0.01	0.507	3.380	3
3.337	0.487	0.49	0.06	0.489	3.372	3
3.334	0.303	0.47	0.06	0.472	3.347	3
3.345	0.087	0.45	-0.02	0.450	3.346	3
3.466	2.145	0.54	0.05	0.543	3.478	5
3.489	1.951	0.57	0.03	0.570	3.491	5
3.445	1.715	0.44	-0.02	0.445	3.447	4
3.451	1.529	0.46	-0.04	0.461	3.467	4
3.452	1.351	0.52	-0.04	0.525	3.489	4
3.413	1.190	0.41	-0.03	0.406	3.483	4
3.416	0.998	0.51	-0.07	0.514	3.522	4
3.434	0.834	0.54	-0.00	0.543	3.534	3
3.422	0.657	0.55	0.04	0.556	3.484	3
3.439	0.493	0.52	0.05	0.524	3.474	3
3.466	0.285	0.54	0.03	0.539	3.473	3
3.462	0.099	0.47	0.00	0.467	3.463	3
3.555	2.135	0.69	0.11	0.702	3.566	5
3.565	1.943	0.64	0.02	0.639	3.567	5
3.572	1.747	0.79	-0.11	0.796	3.573	4
3.561	1.580	0.50	-0.03	0.502	3.572	4
3.568	1.379	0.61	-0.09	0.619	3.600	4
3.553	1.192	0.59	-0.17	0.616	3.615	4
3.545	1.024	0.42	-0.11	0.439	3.641	4
3.585	0.276	0.47	0.08	0.475	3.595	3
3.584	0.084	0.53	-0.00	0.531	3.585	3
3.721	1.951	0.35	0.05	0.348	3.722	5

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.5

VELOCITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 6.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.802	1.987	0.34	0.03	0.339	2.805	5
2.825	1.764	0.19	0.08	0.207	2.827	4
2.663	1.419	0.04	-0.06	0.070	2.718	4
2.707	1.228	0.13	-0.09	0.156	2.725	1
2.698	1.008	0.26	-0.05	0.265	2.699	1
2.740	0.827	0.30	-0.04	0.299	2.742	1
2.718	0.631	0.16	0.02	0.160	2.734	1
2.730	0.437	0.04	-0.05	0.063	2.765	3
2.692	0.258	0.16	0.09	0.182	2.704	3
2.979	2.190	0.14	0.06	0.155	2.998	5
2.976	2.029	0.17	0.07	0.185	2.981	5
2.987	1.799	0.18	0.09	0.203	2.987	4
2.991	1.553	0.21	0.09	0.227	3.006	4
2.940	1.399	0.21	0.10	0.236	2.975	4
2.926	1.215	0.20	0.08	0.215	2.996	4
2.925	1.022	0.14	0.04	0.145	2.926	1
2.943	0.839	0.15	-0.01	0.148	2.944	1
2.917	0.642	0.14	-0.03	0.146	2.930	1
2.925	0.457	0.18	-0.05	0.192	2.960	3
3.001	0.297	0.27	-0.03	0.270	3.016	3
3.014	0.097	0.28	-0.04	0.278	3.015	3
3.147	2.209	0.15	0.03	0.151	3.167	5
3.067	1.984	0.17	0.07	0.182	3.070	5
3.164	1.759	0.20	0.03	0.207	3.166	4
3.141	1.556	0.20	0.09	0.222	3.156	4
3.179	1.358	0.10	0.08	0.126	3.218	4
3.155	1.207	0.17	0.06	0.180	3.221	4
3.127	1.038	0.22	0.05	0.222	3.129	1
3.129	0.826	0.22	-0.03	0.225	3.131	1
3.121	0.653	0.20	-0.06	0.204	3.188	3
3.119	0.474	0.23	-0.07	0.243	3.155	3
3.171	0.308	0.29	-0.05	0.297	3.186	3
3.159	0.097	0.28	-0.02	0.285	3.161	3
3.317	2.217	0.18	0.03	0.187	3.337	5
3.299	1.996	0.24	0.04	0.247	3.302	5
3.301	1.737	0.23	0.05	0.235	3.304	4
3.320	1.527	0.27	0.03	0.275	3.336	4
3.360	1.368	0.30	0.05	0.305	3.395	4
3.341	1.176	0.31	0.04	0.310	3.410	4
3.323	1.023	0.30	0.02	0.304	3.426	4
3.310	0.838	0.29	-0.02	0.295	3.311	1
3.309	0.657	0.28	-0.04	0.287	3.374	3
3.322	0.481	0.31	-0.04	0.312	3.357	3
3.363	0.305	0.29	-0.08	0.305	3.377	3
3.330	0.106	0.31	0.01	0.311	3.332	3
3.434	2.194	0.27	0.05	0.275	3.450	5
3.434	1.971	0.26	0.04	0.260	3.436	5
3.495	1.768	0.30	0.03	0.301	3.487	4
3.499	1.560	0.31	0.03	0.309	3.511	4
3.460	1.388	0.36	0.03	0.360	3.492	4
3.462	1.198	0.38	0.02	0.383	3.524	4
3.455	1.020	0.35	0.03	0.351	3.555	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.448	0.830	0.35	-0.01	0.353	3.546	3
3.462	0.668	0.36	-0.04	0.365	3.526	3
3.482	0.435	0.36	-0.06	0.369	3.515	3
3.468	0.298	0.33	-0.07	0.340	3.480	3
3.478	0.082	0.34	-0.01	0.343	3.479	3
3.600	2.158	0.29	0.03	0.289	3.612	5
3.631	1.957	0.32	0.02	0.323	3.632	5
3.570	1.711	0.31	0.01	0.308	3.573	4
3.592	1.529	0.36	0.03	0.364	3.607	4
3.609	1.352	0.39	0.03	0.386	3.644	4
3.567	1.192	0.41	0.02	0.415	3.628	4
3.578	0.998	0.41	0.03	0.407	3.680	4
3.597	0.838	0.40	0.00	0.400	3.694	3
3.586	0.657	0.40	-0.03	0.404	3.646	3
3.590	0.488	0.37	-0.05	0.378	3.623	3
3.608	0.279	0.33	-0.05	0.335	3.618	3
3.594	0.092	0.34	-0.03	0.346	3.596	3
3.720	2.153	0.33	0.02	0.330	3.732	5
3.729	1.944	0.35	0.01	0.353	3.730	5
3.751	1.741	0.34	0.05	0.348	3.753	4
3.709	1.576	0.37	0.01	0.372	3.719	4
3.733	1.366	0.39	0.01	0.386	3.766	4
3.723	1.171	0.42	0.00	0.416	3.785	4
3.712	1.015	0.49	0.02	0.487	3.806	4
3.712	0.840	0.47	0.02	0.469	3.806	3
3.719	0.662	0.45	-0.04	0.448	3.778	3
3.724	0.485	0.42	-0.05	0.422	3.756	3
3.733	0.277	0.40	-0.04	0.401	3.743	3
3.729	0.084	0.35	-0.01	0.354	3.730	3
3.819	2.125	0.37	0.00	0.370	3.829	5
3.865	1.959	0.43	0.01	0.427	3.867	5
3.853	1.732	0.41	-0.02	0.409	3.855	4
3.844	1.538	0.43	-0.01	0.435	3.857	4
3.828	1.362	0.44	0.01	0.437	3.860	4
3.832	1.169	0.48	0.02	0.484	3.893	4
3.819	0.987	0.46	-0.01	0.464	3.916	4
3.845	0.832	0.55	-0.01	0.549	3.934	3
3.840	0.666	0.55	0.01	0.550	3.897	3
3.827	0.487	0.42	-0.03	0.422	3.858	3
3.833	0.277	0.42	-0.04	0.420	3.843	3
3.839	0.065	0.43	-0.03	0.427	3.839	3
3.969	2.125	0.52	0.08	0.530	3.978	5
3.976	1.933	0.52	0.03	0.525	3.977	5
3.954	1.732	0.44	-0.04	0.445	3.956	4
3.952	1.546	0.40	-0.06	0.400	3.965	4
3.950	1.358	0.53	-0.06	0.536	3.981	4
3.974	1.181	0.52	-0.05	0.522	4.031	4
3.952	0.997	0.55	-0.06	0.551	4.045	4
3.962	0.816	0.52	0.00	0.520	4.045	3
3.960	0.653	0.47	0.03	0.473	4.014	3
3.968	0.435	0.38	0.06	0.386	3.992	3
3.964	0.242	0.44	0.02	0.439	3.972	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.[illegible]262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.6

VELOCITY FIELD DIPOLE WEST/8 WF5/295 SMOKE PUFF GRID 1220 /A780106

PARTICLE VELOCITIES AT SCALED TIME= 7.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
2.994	2.212	-0.06	0.07	0.091	3.015	5
3.038	2.065	0.21	0.12	0.238	3.045	5
3.049	1.843	0.19	0.15	0.244	3.049	4
3.044	1.582	0.12	0.04	0.126	3.057	4
2.995	1.422	0.12	0.02	0.125	3.027	4
2.971	1.223	0.08	0.00	0.075	3.036	4
2.945	1.033	0.03	0.04	0.052	2.947	1
2.963	0.850	0.05	0.06	0.032	2.969	1
2.953	0.660	0.09	0.11	0.140	2.964	1
2.974	0.476	0.12	0.13	0.176	3.012	3
3.081	0.310	0.20	0.10	0.226	3.097	3
3.105	0.099	0.25	0.05	0.250	3.107	3
3.158	2.220	0.12	0.04	0.129	3.209	5
3.130	2.013	0.20	0.09	0.222	3.134	5
3.198	1.773	-0.01	0.06	0.056	3.199	4
3.202	1.563	0.16	0.05	0.171	3.214	4
3.215	1.379	0.15	0.03	0.152	3.251	4
3.182	1.217	0.03	-0.01	0.034	3.246	4
3.172	1.047	0.07	0.00	0.071	3.273	4
3.180	0.820	0.10	0.01	0.096	3.182	1
3.169	0.649	0.11	0.04	0.120	3.235	3
3.193	0.471	0.15	0.06	0.160	3.218	3
3.261	0.304	0.23	0.04	0.236	3.275	3
3.254	0.096	0.27	0.02	0.268	3.255	3
3.369	2.228	0.15	0.04	0.152	3.399	5
3.376	2.015	0.21	0.06	0.221	3.379	5
3.358	1.756	0.16	0.08	0.175	3.360	4
3.404	1.541	0.20	0.04	0.209	3.418	4
3.450	1.384	0.22	0.04	0.219	3.482	4
3.423	1.188	0.17	0.02	0.175	3.488	4
3.393	1.031	0.13	0.02	0.128	3.492	4
3.381	0.831	0.14	-0.01	0.136	3.491	3
3.395	0.649	0.17	0.00	0.172	3.447	3
3.412	0.470	0.22	-0.00	0.221	3.445	3
3.448	0.283	0.23	-0.02	0.232	3.459	3
3.432	0.110	0.28	0.01	0.280	3.433	3
3.508	2.211	0.17	0.05	0.180	3.526	5
3.509	1.991	0.19	0.07	0.203	3.511	5
3.575	1.786	0.23	0.07	0.239	3.575	4
3.592	1.581	0.24	0.07	0.247	3.603	4
3.558	1.402	0.22	0.04	0.224	3.587	4
3.561	1.206	0.21	0.02	0.207	3.620	4
3.542	1.024	0.17	0.00	0.171	3.638	4
3.536	0.826	0.17	-0.01	0.173	3.631	3
3.558	0.658	0.21	-0.01	0.209	3.619	3
3.564	0.467	0.24	-0.02	0.243	3.614	3
3.568	0.279	0.26	-0.02	0.263	3.579	3
3.582	0.079	0.27	-0.00	0.274	3.583	3
3.650	2.168	0.20	0.04	0.204	3.693	5
3.728	1.971	0.26	0.06	0.261	3.730	5
3.602	1.724	0.23	0.06	0.233	3.663	4
3.696	1.544	0.25	0.05	0.256	3.709	4
3.713	1.363	0.23	0.03	0.236	3.746	4
3.681	1.198	0.25	0.01	0.248	3.739	4
3.682	1.064	0.21	-0.00	0.207	3.779	4
3.703	0.833	0.23	-0.03	0.228	3.795	3
3.697	0.645	0.26	-0.03	0.257	3.753	3
3.690	0.474	0.27	-0.02	0.270	3.729	3
3.709	0.264	0.27	-0.03	0.275	3.718	3
3.706	0.084	0.31	-0.01	0.314	3.707	3
3.806	2.158	0.20	0.02	0.198	3.818	5
3.825	1.953	0.23	0.04	0.235	3.826	5
3.842	1.764	0.22	0.07	0.232	3.843	4
3.816	1.586	0.26	0.04	0.266	3.826	4
3.842	1.374	0.26	0.03	0.265	3.873	4

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.843	1.176	0.30	0.02	0.299	3.903	4
3.849	1.018	0.30	-0.01	0.300	3.939	4
3.841	0.843	0.29	-0.01	0.288	3.933	3
3.844	0.647	0.30	-0.04	0.299	3.899	3
3.846	0.466	0.30	-0.04	0.307	3.874	3
3.855	0.261	0.32	-0.03	0.319	3.863	3
3.833	0.076	0.30	-0.04	0.299	3.839	3
3.931	2.130	0.27	0.03	0.277	3.941	5
3.986	1.962	0.27	0.02	0.273	3.987	5
3.970	1.731	0.29	0.02	0.290	3.972	4
3.974	1.545	0.32	0.04	0.322	3.986	4
3.965	1.369	0.34	0.03	0.341	3.995	4
3.981	1.177	0.36	0.02	0.362	4.039	4
3.963	0.935	0.35	-0.01	0.354	4.058	4
4.003	0.832	0.37	-0.01	0.372	4.088	3
3.997	0.657	0.36	-0.05	0.367	4.050	3
3.958	0.468	0.34	-0.05	0.341	3.985	3
3.964	0.259	0.35	-0.04	0.354	3.973	3
3.970	0.059	0.35	-0.01	0.347	3.971	3
4.104	2.130	0.30	-0.01	0.299	4.113	5
4.115	1.932	0.32	-0.01	0.319	4.116	5
4.077	1.726	0.30	0.01	0.300	4.079	4
4.076	1.540	0.32	0.02	0.325	4.088	4
4.102	1.352	0.37	0.01	0.368	4.132	4
4.131	1.177	0.39	0.01	0.392	4.137	4
4.117	0.995	0.40	0.02	0.405	4.206	4
4.119	0.806	0.39	-0.04	0.397	4.198	3
4.105	0.647	0.37	-0.04	0.371	4.156	3
4.099	0.429	0.37	-0.05	0.370	4.122	3
4.099	0.234	0.36	-0.04	0.361	4.106	3
4.104	0.048	0.36	-0.01	0.357	4.104	3
4.210	2.136	0.34	-0.01	0.339	4.220	5
4.239	1.955	0.39	0.00	0.389	4.240	5
4.231	1.723	0.39	-0.01	0.391	4.233	4
4.240	1.552	0.42	0.01	0.424	4.251	4
4.215	1.370	0.36	0.00	0.363	4.244	4
4.227	1.183	0.42	0.00	0.421	4.281	4
4.244	0.998	0.44	-0.00	0.437	4.330	4
4.244	0.838	0.43	-0.02	0.434	4.326	3
4.251	0.671	0.42	-0.05	0.423	4.303	3
4.242	0.433	0.38	-0.05	0.387	4.264	3
4.228	0.269	0.39	-0.04	0.389	4.236	3
4.236	0.067	0.39	-0.03	0.392	4.235	3
4.349	2.157	0.43	-0.05	0.428	4.359	5
4.348	1.970	0.48	0.02	0.477	4.350	5
4.341	1.737	0.42	-0.05	0.424	4.343	4
4.355	1.578	0.45	-0.07	0.452	4.364	4
4.351	1.377	0.45	-0.03	0.447	4.378	4
4.350	1.212	0.57	-0.01	0.567	4.398	4
4.367	1.023	0.55	0.02	0.553	4.445	4
4.368	0.838	0.57	0.02	0.567	4.448	3
4.359	0.652	0.58	-0.04	0.578	4.408	3
4.353	0.462	0.53	-0.04	0.531	4.377	3
4.364	0.270	0.47	-0.02	0.468	4.372	3
4.365	0.074	0.48	-0.02	0.484	4.366	3
4.492	2.135	0.38	-0.08	0.390	4.501	5
4.473	1.926	0.50	-0.04	0.497	4.473	5
4.481	1.742	0.35	-0.10	0.367	4.483	4
4.489	1.550	0.31	-0.12	0.334	4.499	4
4.486	1.369	0.31	-0.06	0.313	4.513	4
4.484	1.185	0.32	-0.02	0.321	4.534	4
4.496	0.992	0.38	-0.07	0.387	4.579	4
4.482	0.823	0.49	-0.03	0.494	4.557	3
4.499	0.642	0.41	-0.04	0.412	4.545	3
4.507	0.074	0.29	-0.09	0.305	4.507	3

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TABLE 7.7

VELOCITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 8.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.243	2.241	0.21	0.08	0.221	3.266	5
3.186	2.036	0.25	0.03	0.062	3.191	5
3.240	1.566	0.01	-0.02	0.018	3.252	4
3.257	1.379	0.06	-0.02	0.068	3.302	4
3.227	1.223	0.34	0.11	0.358	3.289	4
3.196	1.053	0.11	0.07	0.127	3.295	4
3.212	0.836	0.12	0.08	0.148	3.213	1
3.206	0.673	0.10	0.06	0.118	3.276	3
3.223	0.501	0.10	0.04	0.105	3.261	3
3.324	0.329	0.14	0.07	0.151	3.340	3
3.326	0.107	0.11	0.02	0.115	3.327	3
3.427	2.248	0.19	0.07	0.200	3.449	5
3.444	2.032	0.18	0.03	0.180	3.448	5
3.451	1.551	0.07	0.02	0.074	3.464	4
3.498	1.390	0.07	-0.01	0.066	3.529	4
3.462	1.185	0.07	-0.02	0.069	3.526	4
3.423	1.035	0.07	0.02	0.071	3.520	4
3.415	0.840	0.09	0.05	0.106	3.517	3
3.432	0.659	0.11	0.06	0.124	3.495	3
3.473	0.485	0.13	0.09	0.161	3.506	3
3.524	0.298	0.20	0.08	0.217	3.536	3
3.513	0.108	0.18	-0.02	0.182	3.514	3
3.557	2.229	0.12	0.06	0.134	3.576	5
3.566	2.014	0.15	0.06	0.156	3.569	5
3.642	1.807	0.17	0.05	0.173	3.643	4
3.653	1.598	0.11	0.02	0.113	3.663	4
3.612	1.414	0.11	0.02	0.110	3.639	4
3.609	1.211	0.09	0.01	0.090	3.666	4
3.582	1.025	0.08	0.01	0.084	3.677	4
3.577	0.829	0.09	0.03	0.096	3.672	3
3.613	0.664	0.13	0.05	0.136	3.673	3
3.654	0.477	0.18	0.07	0.190	3.685	3
3.646	0.289	0.19	0.06	0.200	3.657	3
3.662	0.082	0.19	0.01	0.192	3.663	3
3.740	2.184	0.15	0.06	0.159	3.754	5
3.800	1.991	0.15	0.05	0.160	3.802	5
3.724	1.745	0.15	0.06	0.161	3.726	4
3.763	1.558	0.14	0.03	0.148	3.775	4
3.773	1.369	0.13	0.01	0.127	3.804	4
3.740	1.199	0.12	-0.00	0.117	3.798	4
3.731	1.000	0.11	-0.01	0.110	3.829	4
3.759	0.827	0.12	0.00	0.117	3.849	3
3.757	0.646	0.17	0.03	0.168	3.822	3
3.777	0.477	0.19	0.04	0.195	3.807	3
3.794	0.263	0.22	0.02	0.225	3.804	3
3.802	0.083	0.24	0.01	0.237	3.803	3
3.865	2.167	0.15	0.04	0.160	3.877	5
3.893	1.972	0.17	0.06	0.186	3.895	5
3.912	1.784	0.19	0.05	0.195	3.912	4
3.889	1.601	0.17	0.04	0.173	3.878	4
3.916	1.384	0.17	0.02	0.172	3.944	4
3.928	1.179	0.20	0.00	0.199	3.986	4
3.919	1.011	0.13	-0.02	0.131	4.009	4
3.914	0.840	0.15	0.00	0.153	4.003	3
3.925	0.642	0.19	0.02	0.191	3.978	3
3.934	0.462	0.22	0.02	0.218	3.961	3
3.948	0.258	0.23	0.02	0.234	3.957	3
3.933	0.063	0.26	-0.03	0.258	3.933	3
4.006	2.147	0.17	0.06	0.183	4.016	5
4.058	1.975	0.17	0.05	0.177	4.059	5
4.053	1.747	0.20	0.06	0.210	4.055	4
4.061	1.562	0.19	0.05	0.200	4.071	4
4.056	1.377	0.20	0.02	0.201	4.084	4
4.072	1.178	0.18	-0.00	0.181	4.128	4
4.053	0.981	0.18	-0.01	0.184	4.147	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
4.102	0.828	0.22	-0.01	0.222	4.185	3
4.091	0.646	0.20	-0.00	0.204	4.142	3
4.054	0.459	0.23	0.01	0.234	4.080	3
4.070	0.254	0.27	0.01	0.268	4.078	3
4.074	0.058	0.27	0.00	0.267	4.075	3
4.187	2.136	0.20	0.05	0.210	4.196	5
4.205	1.939	0.22	0.05	0.225	4.206	5
4.166	1.741	0.22	0.06	0.233	4.167	4
4.171	1.553	0.23	0.05	0.236	4.182	4
4.204	1.360	0.24	0.02	0.238	4.233	4
4.238	1.180	0.24	0.01	0.242	4.292	4
4.225	0.999	0.23	0.00	0.234	4.311	4
4.228	0.795	0.25	-0.02	0.249	4.302	3
4.210	0.637	0.25	-0.01	0.248	4.258	3
4.208	0.417	0.27	-0.01	0.268	4.229	3
4.209	0.227	0.28	0.01	0.285	4.215	3
4.220	0.044	0.31	-0.00	0.312	4.221	3
4.299	2.140	0.20	0.03	0.208	4.307	5
4.340	1.962	0.23	0.04	0.234	4.341	5
4.340	1.730	0.26	0.04	0.267	4.342	4
4.353	1.561	0.28	0.04	0.280	4.368	4
4.326	1.378	0.27	0.03	0.275	4.352	4
4.346	1.186	0.27	0.01	0.268	4.397	4
4.369	1.002	0.29	0.02	0.294	4.452	4
4.367	0.829	0.30	-0.02	0.296	4.445	3
4.368	0.654	0.28	-0.04	0.283	4.417	3
4.356	0.421	0.29	-0.01	0.292	4.376	3
4.348	0.257	0.31	-0.02	0.315	4.355	3
4.359	0.057	0.33	-0.02	0.326	4.359	3
4.455	2.152	0.23	0.02	0.235	4.465	5
4.472	1.981	0.28	0.04	0.285	4.474	5
4.460	1.737	0.28	0.04	0.287	4.462	4
4.485	1.579	0.31	0.04	0.316	4.494	4
4.482	1.379	0.32	0.03	0.319	4.507	4
4.499	1.215	0.33	0.02	0.329	4.545	4
4.509	1.020	0.31	-0.02	0.313	4.586	4
4.514	0.835	0.32	-0.02	0.320	4.590	3
4.505	0.635	0.32	-0.05	0.322	4.550	3
4.496	0.446	0.34	-0.04	0.341	4.518	3
4.497	0.260	0.33	-0.03	0.334	4.505	3
4.502	0.067	0.34	-0.02	0.338	4.503	3
4.601	2.122	0.27	0.01	0.267	4.608	5
4.604	1.923	0.30	0.02	0.303	4.604	5
4.597	1.733	0.31	0.03	0.314	4.598	4
4.604	1.539	0.33	0.03	0.335	4.615	4
4.603	1.364	0.34	0.01	0.344	4.630	4
4.604	1.181	0.35	-0.00	0.348	4.653	4
4.624	0.967	0.35	-0.03	0.352	4.709	4
4.630	0.811	0.37	-0.03	0.373	4.700	3
4.634	0.626	0.37	-0.04	0.369	4.677	3
4.622	0.433	0.35	-0.04	0.355	4.642	3
4.616	0.251	0.36	-0.03	0.360	4.623	3
4.625	0.057	0.37	-0.02	0.366	4.625	3
4.742	2.140	0.32	0.00	0.325	4.751	5
4.743	1.95[illegible]	0.31	-0.01	0.314	4.744	5
4.743	1.732	0.35	-0.01	0.347	4.744	4
4.735	1.528	0.35	-0.03	0.352	4.748	4
4.744	1.365	0.40	-0.00	0.404	4.769	4
4.742	1.176	0.39	-0.02	0.393	4.791	4
4.743	1.018	0.41	-0.01	0.415	4.816	4
4.753	0.806	0.41	-0.02	0.406	4.821	3
4.755	0.608	0.42	-0.08	0.430	4.793	3
4.754	0.436	0.39	-0.05	0.395	4.774	3
4.752	0.260	0.37	-0.04	0.373	4.759	3
4.754	0.076	0.38	-0.01	0.377	4.755	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.8

VELOCITY FIELD   DIPOLE #EST/8   WFS/225   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 9.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.470	2.270	-0.01	0.03	0.034	3.494	5
3.434	2.040	0.03	0.03	0.041	3.439	5
3.468	1.550	0.08	-0.02	0.067	3.432	4
3.513	1.368	0.09	0.02	0.093	3.544	4
3.495	1.187	0.11	0.05	0.121	3.548	4
3.453	1.050	0.12	0.09	0.149	3.546	4
3.445	0.868	0.09	0.08	0.120	3.556	4
3.463	0.682	0.07	0.07	0.099	3.529	3
3.527	0.516	0.05	0.05	0.095	3.545	3
3.551	0.312	0.03	0.01	0.027	3.575	3
3.549	0.102	0.03	-0.00	0.029	3.550	3
3.593	2.250	0.09	0.06	0.110	3.614	5
3.605	2.027	0.09	0.02	0.094	3.610	5
3.595	1.815	0.05	0.00	0.062	3.683	4
3.565	1.594	-0.02	-0.03	0.039	3.676	4
3.537	1.416	0.06	-0.00	0.057	3.665	4
3.634	1.214	0.07	0.01	0.073	3.690	4
3.609	1.038	0.08	0.06	0.103	3.700	4
3.608	0.849	0.10	0.09	0.128	3.706	3
3.652	0.589	0.11	0.09	0.143	3.717	3
3.706	0.502	0.12	0.06	0.131	3.740	3
3.693	0.309	0.08	0.03	0.088	3.706	3
3.710	0.088	0.09	0.02	0.090	3.711	3
3.780	2.204	0.08	0.06	0.101	3.796	5
3.823	2.003	-0.01	0.01	0.012	3.827	5
3.763	1.757	0.08	0.01	0.079	3.764	4
3.793	1.565	0.07	0.01	0.070	3.809	4
3.805	1.371	0.08	0.01	0.080	3.837	4
3.773	1.200	0.09	0.01	0.093	3.830	4
3.771	1.005	0.13	0.04	0.138	3.866	4
3.792	0.839	0.08	0.07	0.112	3.883	3
3.815	0.666	0.13	0.08	0.151	3.873	3
3.830	0.497	0.12	0.07	0.141	3.862	3
3.855	0.277	0.13	0.06	0.141	3.866	3
3.859	0.091	0.10	0.03	0.101	3.861	3
3.911	2.184	0.11	0.05	0.124	3.925	5
3.944	1.992	0.12	0.05	0.133	3.947	5
3.967	1.797	0.13	0.03	0.135	3.968	4
3.932	1.612	0.09	0.02	0.092	3.940	4
3.960	1.387	0.09	0.01	0.089	3.987	4
3.980	1.181	0.11	0.02	0.112	4.037	4
3.951	1.011	0.08	0.03	0.089	4.041	4
3.955	0.850	0.10	0.06	0.120	4.046	3
3.979	0.658	0.13	0.07	0.148	4.033	3
3.996	0.478	0.15	0.06	0.158	4.024	3
4.013	0.269	0.15	0.04	0.155	4.022	3
4.029	0.062	0.18	0.02	0.181	4.009	3
4.055	2.168	0.13	0.05	0.141	4.067	5
4.112	1.995	0.15	0.06	0.164	4.114	5
4.109	1.765	0.13	0.04	0.133	4.110	4
4.112	1.573	0.12	0.02	0.118	4.122	4
4.111	1.381	0.14	0.01	0.141	4.139	4
4.115	1.179	0.09	0.01	0.094	4.171	4
4.078	0.982	0.10	0.03	0.103	4.191	4
4.162	0.831	0.14	0.03	0.147	4.244	3
4.147	0.657	0.14	0.06	0.152	4.199	3
4.120	0.472	0.16	0.06	0.167	4.147	3
4.147	0.264	0.18	0.04	0.186	4.155	3
4.152	0.062	0.19	0.02	0.188	4.152	3
4.248	2.160	0.16	0.08	0.175	4.259	5
4.269	1.961	0.16	0.07	0.172	4.270	5
4.229	1.762	0.15	0.05	0.153	4.230	4
4.232	1.567	0.13	0.03	0.136	4.242	4
4.266	1.367	0.13	0.02	0.135	4.294	4
4.301	1.151	0.14	0.01	0.138	4.354	4
4.284	1.000	0.13	0.01	0.129	4.369	4
4.295	0.797	0.15	0.03	0.157	4.368	4
4.278	0.643	0.16	0.04	0.169	4.326	3
4.284	0.423	0.18	0.04	0.185	4.304	3
4.292	0.235	0.20	0.04	0.206	4.299	3
4.310	0.048	0.21	0.02	0.215	4.310	3
4.350	2.158	0.16	0.06	0.177	4.370	5
4.406	1.983	0.17	0.07	0.180	4.408	5
4.415	1.747	0.18	0.05	0.187	4.417	4
4.434	1.574	0.17	0.03	0.175	4.443	4
4.401	1.386	0.17	0.02	0.170	4.426	4
4.413	1.186	0.14	-0.00	0.139	4.464	4
4.447	1.006	0.17	0.01	0.174	4.527	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
4.449	0.828	0.19	0.01	0.194	4.525	3
4.446	0.651	0.19	0.02	0.187	4.494	3
4.442	0.424	0.22	0.03	0.219	4.462	3
4.437	0.257	0.22	0.02	0.224	4.447	3
4.455	0.055	0.24	0.00	0.238	4.455	3
4.524	2.167	0.18	0.06	0.188	4.534	5
4.552	1.998	0.20	0.05	0.206	4.555	5
4.539	1.752	0.18	0.04	0.189	4.540	4
4.569	1.594	0.18	0.04	0.184	4.576	4
4.568	1.389	0.19	0.03	0.195	4.592	4
4.585	1.218	0.19	0.01	0.188	4.629	4
4.593	1.016	0.20	0.00	0.196	4.670	4
4.601	0.831	0.21	0.00	0.211	4.676	3
4.594	0.628	0.22	0.01	0.217	4.636	3
4.595	0.441	0.25	0.01	0.246	4.616	3
4.597	0.257	0.26	0.01	0.256	4.604	3
4.601	0.064	0.25	0.00	0.249	4.602	3
4.679	2.133	0.20	0.05	0.207	4.687	5
4.690	1.937	0.22	0.05	0.223	4.691	5
4.689	1.748	0.23	0.05	0.232	4.690	4
4.703	1.553	0.24	0.04	0.244	4.713	4
4.705	1.371	0.24	0.02	0.245	4.730	4
4.707	1.182	0.25	0.01	0.249	4.755	4
4.726	0.970	0.24	0.02	0.246	4.809	4
4.736	0.807	0.26	0.01	0.257	4.804	3
4.743	0.619	0.27	0.00	0.258	4.783	3
4.727	0.430	0.27	0.01	0.266	4.746	3
4.727	0.247	0.29	0.01	0.286	4.733	3
4.739	0.056	0.29	0.01	0.293	4.739	3
4.834	2.150	0.23	0.05	0.232	4.843	5
4.836	1.965	0.24	0.05	0.241	4.837	5
4.843	1.744	0.25	0.06	0.255	4.844	4
4.842	1.536	0.26	0.04	0.265	4.852	4
4.860	1.375	0.28	0.04	0.279	4.884	4
4.856	1.179	0.27	0.02	0.276	4.903	4
4.853	1.015	0.27	-0.00	0.271	4.930	4
4.866	0.795	0.27	-0.03	0.277	4.930	3
4.869	0.600	0.28	0.01	0.277	4.906	3
4.867	0.426	0.29	-0.01	0.287	4.886	3
4.871	0.252	0.32	-0.01	0.318	4.878	3
4.877	0.073	0.33	-0.01	0.328	4.878	3
4.969	2.125	0.26	0.04	0.267	4.977	5
5.012	1.929	0.32	0.05	0.329	5.013	5
4.982	1.751	0.29	0.03	0.297	4.983	4
4.991	1.558	0.31	0.04	0.313	5.000	4
5.020	1.375	0.34	0.02	0.337	5.043	4
4.998	1.175	0.31	0.01	0.313	5.044	4
5.017	1.005	0.32	-0.03	0.317	5.089	4
5.012	0.830	0.32	-0.01	0.317	5.080	3
5.005	0.612	0.33	-0.03	0.337	5.044	3
5.000	0.430	0.34	-0.03	0.340	5.019	3
5.009	0.236	0.35	-0.01	0.347	5.015	3
4.995	0.066	0.35	-0.02	0.355	4.996	3
5.113	2.112	0.32	0.03	0.325	5.120	5
5.134	1.932	0.36	0.03	0.365	5.134	5
5.122	1.740	0.33	0.02	0.328	5.123	4
5.109	1.529	0.37	0.02	0.367	5.120	4
5.137	1.380	0.40	0.03	0.400	5.159	4
5.143	1.165	0.42	-0.02	0.420	5.194	4
5.138	1.002	0.41	-0.01	0.406	5.209	4
5.149	0.815	0.40	-0.02	0.404	5.213	3
5.157	0.660	0.41	-0.03	0.413	5.199	3
5.149	0.421	0.41	-0.03	0.412	5.156	3
5.131	0.231	0.37	-0.03	0.366	5.136	3
5.140	0.047	0.39	-0.02	0.395	5.141	3
5.243	2.151	0.27	-0.03	0.268	5.251	5
5.247	1.948	0.29	-0.03	0.288	5.248	5
5.266	1.74	0.26	-0.01	0.256	5.267	4
5.266	1.574	0.27	-0.03	0.276	5.274	4
5.270	1.376	0.41	-0.00	0.405	5.292	4
5.275	1.184	0.37	-0.01	0.367	5.318	4
5.288	1.012	0.36	-0.01	0.356	5.355	4
5.274	0.834	0.39	-0.01	0.389	5.339	3
5.288	0.639	0.38	-0.03	0.380	5.327	3
5.266	0.434	0.40	-0.04	0.398	5.284	3
5.259	0.247	0.33	-0.06	0.339	5.265	3
5.270	0.039	0.31	-0.01	0.314	5.271	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.9

VELOCITY FIELD   DIPOLE WEST/8   #F5/295   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 10.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.515	2.267	0.02	0.03	0.037	3.638	5
3.626	2.033	0.02	0.02	0.031	3.630	5
3.675	1.814	-0.12	0.01	0.125	3.675	4
3.664	1.593	0.07	0.07	0.102	3.673	4
3.657	1.420	0.06	0.05	0.077	3.683	4
3.662	1.225	0.09	0.06	0.109	3.716	4
3.635	1.063	0.06	0.07	0.090	3.721	4
3.637	0.877	0.05	0.06	0.076	3.767	4
3.685	0.715	0.06	0.04	0.074	3.753	3
3.724	0.516	-0.01	0.03	0.030	3.760	3
3.704	0.314	-0.00	0.02	0.018	3.718	3
3.723	0.093	-0.01	0.01	0.014	3.724	3
3.799	2.219	0.04	0.02	0.043	3.816	5
3.809	2.001	-0.03	-0.01	0.030	3.812	5
3.782	1.758	0.05	0.01	0.048	3.783	4
3.819	1.567	0.06	0.02	0.066	3.829	4
3.832	1.378	0.08	0.04	0.087	3.862	4
3.807	1.212	0.10	0.06	0.116	3.862	4
3.817	1.027	0.11	0.07	0.133	3.906	4
3.816	0.870	0.05	0.08	0.090	3.941	4
3.851	0.693	0.08	0.06	0.097	3.913	3
3.850	0.517	0.05	0.04	0.063	3.894	3
3.881	0.294	0.03	0.03	0.039	3.892	3
3.872	0.100	-0.00	0.02	0.021	3.873	3
3.917	2.199	0.04	0.03	0.045	3.952	5
3.976	2.001	0.06	0.01	0.058	3.978	5
3.997	1.807	0.05	0.02	0.051	3.998	4
3.954	1.615	0.05	0.01	0.047	3.962	4
3.990	1.392	0.05	0.03	0.056	4.008	4
4.007	1.192	0.06	0.05	0.076	4.062	4
3.986	1.031	0.12	0.08	0.142	4.070	4
3.990	0.879	0.10	0.09	0.136	4.108	4
4.016	0.684	0.08	0.07	0.111	4.074	3
4.034	0.496	0.08	0.04	0.086	4.064	3
4.050	0.293	0.07	0.03	0.073	4.060	3
4.049	0.075	0.06	0.04	0.068	4.050	3
4.095	2.183	0.10	0.03	0.102	4.108	5
4.147	2.008	0.00	0.00	0.003	4.150	5
4.141	1.768	0.07	-0.02	0.068	4.142	4
4.145	1.576	0.08	0.00	0.079	4.155	4
4.154	1.386	0.10	0.02	0.105	4.191	4
4.147	1.191	0.10	0.06	0.118	4.200	4
4.132	1.000	0.10	0.07	0.127	4.220	4
4.206	0.853	0.12	0.08	0.147	4.291	4
4.189	0.632	0.10	0.06	0.120	4.244	3
4.163	0.492	0.10	0.05	0.109	4.192	3
4.195	0.275	0.10	0.02	0.101	4.203	3
4.202	0.071	0.11	0.04	0.113	4.202	3
4.294	2.179	0.11	0.03	0.113	4.306	5
4.312	1.978	0.10	0.02	0.100	4.314	5
4.264	1.770	0.07	-0.00	0.066	4.265	4
4.265	1.571	0.07	-0.00	0.067	4.274	4
4.300	1.372	0.07	0.02	0.076	4.327	4
4.339	1.187	0.10	0.03	0.101	4.391	4
4.322	1.011	0.10	0.05	0.117	4.404	4
4.340	0.814	0.12	0.07	0.139	4.416	4
4.325	0.661	0.12	0.06	0.133	4.376	3
4.335	0.438	0.12	0.04	0.128	4.357	3
4.346	0.246	0.12	0.02	0.118	4.353	3
4.368	0.052	0.13	0.00	0.128	4.368	3
4.409	2.178	0.12	0.05	0.130	4.421	5
4.454	2.002	0.11	0.04	0.120	4.457	5
4.464	1.760	0.10	0.02	0.107	4.465	4
4.479	1.582	0.10	0.02	0.103	4.488	4
4.446	1.392	0.10	0.02	0.105	4.479	4
4.459	1.189	0.09	0.03	0.098	4.500	4
4.494	1.014	0.12	0.04	0.122	4.572	4
4.504	0.839	0.13	0.05	0.140	4.581	4
4.498	0.665	0.12	0.06	0.134	4.547	3
4.503	0.436	0.14	0.04	0.145	4.524	3
4.498	0.270	0.12	0.04	0.130	4.506	3
4.520	0.059	0.15	0.02	0.149	4.521	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
4.579	2.188	0.14	0.06	0.155	4.591	5
4.610	2.015	0.14	0.04	0.145	4.613	5
4.589	1.763	0.12	0.02	0.120	4.590	4
4.615	1.603	0.10	0.02	0.102	4.622	4
4.618	1.397	0.11	0.02	0.114	4.641	4
4.634	1.221	0.11	0.01	0.110	4.678	4
4.647	1.023	0.14	0.04	0.145	4.724	4
4.663	0.839	0.16	0.04	0.161	4.738	4
4.657	0.638	0.16	0.05	0.166	4.701	3
4.665	0.451	0.17	0.04	0.178	4.668	3
4.671	0.265	0.18	0.03	0.182	4.679	3
4.672	0.068	0.17	0.02	0.170	4.673	3
4.739	2.153	0.15	0.06	0.160	4.748	5
4.754	1.956	0.16	0.05	0.167	4.755	5
4.751	1.751	0.14	0.03	0.143	4.752	4
4.767	1.565	0.14	0.03	0.141	4.776	4
4.769	1.376	0.14	0.02	0.138	4.793	4
4.773	1.185	0.15	0.02	0.147	4.820	4
4.790	0.977	0.14	0.08	0.158	4.871	4
4.807	0.816	0.17	0.04	0.172	4.876	4
4.819	0.625	0.18	0.03	0.185	4.859	3
4.803	0.436	0.18	0.02	0.182	4.823	3
4.809	0.255	0.20	0.03	0.199	4.816	3
4.820	0.059	0.18	0.01	0.184	4.820	3
4.901	2.171	0.17	0.06	0.185	4.911	5
4.905	1.984	0.17	0.05	0.181	4.907	5
4.914	1.761	0.17	0.04	0.176	4.915	4
4.913	1.547	0.16	0.02	0.162	4.923	4
4.933	1.383	0.16	0.01	0.164	4.956	4
4.930	1.184	0.17	0.01	0.169	4.976	4
4.933	1.018	0.18	0.02	0.179	5.004	4
4.946	0.791	0.20	0.01	0.202	5.009	4
4.952	0.607	0.21	0.03	0.216	4.989	3
4.953	0.430	0.22	0.03	0.221	4.972	3
4.964	0.255	0.22	0.02	0.226	4.970	3
4.972	0.073	0.23	0.01	0.228	4.972	3
5.042	2.145	0.18	0.06	0.193	5.050	5
5.096	1.949	0.20	0.06	0.203	5.096	5
5.058	1.766	0.18	0.05	0.183	5.059	4
5.072	1.570	0.18	0.03	0.186	5.080	4
5.100	1.382	0.18	0.02	0.178	5.122	4
5.075	1.178	0.18	0.01	0.179	5.120	4
5.095	0.995	0.19	-0.01	0.185	5.168	4
5.092	0.829	0.20	0.01	0.196	5.159	4
5.096	0.610	0.22	0.02	0.224	5.133	3
5.093	0.430	0.23	0.02	0.232	5.111	3
5.110	0.240	0.26	0.03	0.259	5.115	3
5.097	0.065	0.25	0.01	0.247	5.097	3
5.201	2.132	0.22	0.07	0.228	5.209	5
5.227	1.948	0.21	0.05	0.219	5.228	5
5.213	1.751	0.22	0.04	0.221	5.214	4
5.202	1.540	0.21	0.03	0.211	5.212	4
5.238	1.386	0.22	0.01	0.223	5.259	4
5.250	1.166	0.22	0.01	0.222	5.295	4
5.240	1.002	0.22	0.01	0.221	5.309	4
5.249	0.811	0.23	0.00	0.230	5.311	4
5.264	0.655	0.25	0.01	0.252	5.305	3
5.260	0.419	0.27	0.01	0.266	5.277	3
5.237	0.228	0.26	0.00	0.263	5.241	3
5.257	0.043	0.30	0.00	0.297	5.257	3
5.330	2.158	0.23	0.05	0.235	5.339	5
5.338	1.955	0.24	0.04	0.240	5.339	5
5.366	1.75	0.28	0.05	0.289	5.367	4
5.366	1.581	0.27	0.04	0.275	5.373	4
5.403	1.385	0.33	0.03	0.330	5.423	4
5.406	1.195	0.33	0.03	0.336	5.446	4
5.405	1.010	0.30	-0.00	0.296	5.471	4
5.395	0.834	0.30	0.01	0.304	5.459	4
5.408	0.630	0.30	-0.01	0.302	5.445	3
5.381	0.425	0.29	-0.01	0.287	5.398	3
5.379	0.234	0.33	-0.01	0.328	5.385	3
5.394	0.034	0.35	-0.01	0.348	5.394	3

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TABLE 7.10

VELOCITY FIELD DIPOLE WEST/8 WF5/295 SMOKE PUFF GRID 1220 /A780106

PARTICLE VELOCITIES AT SCALED TIME= 11.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
3.935	2.198	-0.05	-0.04	0.064	3.950	5
3.983	2.002	-0.01	0.01	0.015	3.985	5
3.971	1.627	0.06	0.09	0.109	3.977	4
4.029	1.208	0.09	0.03	0.098	4.081	4
4.018	1.045	0.03	-0.04	0.052	4.099	4
4.012	0.892	0.01	-0.07	0.070	4.127	4
4.032	0.594	-0.01	-0.03	0.031	4.091	3
4.045	0.505	-0.02	0.02	0.025	4.076	3
4.057	0.290	-0.02	0.01	0.025	4.067	3
4.106	2.188	-0.08	0.01	0.078	4.120	5
4.156	1.766	0.03	0.04	0.048	4.157	4
4.163	1.582	0.01	0.04	0.045	4.172	4
4.182	1.211	0.08	0.04	0.089	4.232	4
4.164	1.020	0.06	0.01	0.059	4.248	4
4.242	0.873	0.08	-0.01	0.079	4.355	4
4.184	0.497	0.01	-0.02	0.026	4.213	3
4.214	0.279	0.01	0.02	0.026	4.223	3
4.320	2.182	0.04	0.01	0.042	4.333	5
4.334	1.979	0.03	0.00	0.033	4.336	5
4.282	1.768	0.06	0.02	0.066	4.283	4
4.288	1.576	0.09	0.05	0.105	4.297	4
4.325	1.383	0.10	0.06	0.113	4.351	4
4.368	1.204	0.07	0.06	0.093	4.417	4
4.356	1.033	0.09	0.06	0.109	4.433	4
4.378	0.836	0.09	0.05	0.106	4.457	3
4.356	0.680	0.05	0.04	0.064	4.409	3
4.364	0.448	0.04	0.03	0.047	4.387	3
4.372	0.252	0.04	0.02	0.045	4.379	3
4.399	0.053	0.05	0.02	0.055	4.399	3
4.433	2.190	0.05	0.01	0.051	4.451	5
4.482	2.007	0.05	-0.00	0.051	4.485	5
4.489	1.763	0.05	0.01	0.051	4.490	4
4.505	1.588	0.06	0.02	0.067	4.514	4
4.476	1.403	0.08	0.04	0.089	4.499	4
4.483	1.205	0.10	0.07	0.117	4.530	4
4.531	1.034	0.10	0.07	0.128	4.605	4
4.542	0.857	0.10	0.05	0.111	4.623	3
4.531	0.685	0.07	0.05	0.089	4.582	3
4.537	0.449	0.06	0.03	0.068	4.559	3
4.526	0.283	0.05	0.03	0.054	4.535	3
4.557	0.065	0.07	0.01	0.071	4.557	3
4.618	2.204	0.08	0.03	0.090	4.631	5
4.646	2.026	0.07	0.02	0.073	4.649	5
4.621	1.770	0.08	0.02	0.079	4.622	4
4.644	1.610	0.08	0.03	0.083	4.651	4
4.650	1.407	0.08	0.04	0.089	4.672	4
4.664	1.230	0.07	0.04	0.081	4.706	4
4.691	1.040	0.11	0.06	0.120	4.762	4
4.708	0.855	0.11	0.05	0.121	4.785	3
4.701	0.656	0.10	0.05	0.108	4.747	3
4.711	0.466	0.09	0.04	0.100	4.734	3
4.717	0.276	0.09	0.03	0.090	4.725	3
4.716	0.073	0.09	0.01	0.087	4.716	3
4.781	2.169	0.10	0.03	0.106	4.791	5
4.798	1.968	0.10	0.02	0.099	4.799	5
4.787	1.769	0.08	0.02	0.081	4.788	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
4.803	1.573	0.09	0.03	0.090	4.812	4
4.805	1.384	0.08	0.03	0.089	4.828	4
4.812	1.195	0.09	0.04	0.101	4.857	4
4.853	0.833	0.11	0.05	0.122	4.924	3
4.871	0.638	0.13	0.04	0.136	4.912	3
4.850	0.440	0.10	0.01	0.099	4.870	3
4.861	0.265	0.11	0.03	0.115	4.868	3
4.867	0.064	0.10	0.01	0.102	4.867	3
4.952	2.189	0.12	0.04	0.130	4.963	5
4.953	1.998	0.11	0.03	0.112	4.955	5
4.960	1.770	0.10	0.02	0.105	4.961	4
4.955	1.551	0.09	0.01	0.095	4.965	4
4.976	1.388	0.10	0.02	0.100	4.998	4
4.976	1.192	0.11	0.04	0.112	5.020	4
4.983	1.029	0.12	0.05	0.130	5.051	4
5.004	0.801	0.14	0.04	0.147	5.068	3
5.014	0.615	0.15	0.02	0.150	5.052	3
5.016	0.441	0.15	0.04	0.154	5.035	3
5.025	0.265	0.14	0.03	0.141	5.032	3
5.034	0.077	0.14	0.01	0.140	5.034	3
5.093	2.164	0.14	0.04	0.150	5.107	5
5.154	1.964	0.15	0.03	0.153	5.155	5
5.108	1.779	0.12	0.03	0.121	5.109	4
5.123	1.576	0.12	0.01	0.121	5.131	4
5.153	1.388	0.14	0.02	0.140	5.174	4
5.130	1.183	0.15	0.02	0.149	5.174	4
5.154	1.002	0.16	0.05	0.166	5.225	4
5.155	0.837	0.17	0.03	0.171	5.223	3
5.166	0.623	0.18	0.05	0.187	5.203	3
5.164	0.441	0.18	0.04	0.187	5.183	3
5.187	0.252	0.19	0.03	0.193	5.193	3
5.166	0.068	0.16	0.01	0.163	5.166	3
5.265	2.154	0.16	0.05	0.170	5.274	5
5.289	1.965	0.15	0.04	0.160	5.290	5
5.273	1.763	0.14	0.03	0.138	5.274	4
5.260	1.549	0.14	0.02	0.140	5.269	4
5.300	1.390	0.15	0.02	0.152	5.320	4
5.315	1.168	0.17	0.01	0.171	5.359	4
5.303	1.008	0.17	0.03	0.172	5.371	4
5.320	0.818	0.19	0.04	0.193	5.382	3
5.341	0.664	0.20	0.04	0.208	5.332	3
5.339	0.426	0.20	0.03	0.205	5.356	3
5.313	0.231	0.19	0.01	0.189	5.318	3
5.343	0.047	0.20	0.02	0.206	5.343	3
5.396	2.177	0.16	0.05	0.166	5.405	5
5.405	1.970	0.16	0.04	0.165	5.407	5
5.444	1.766	0.17	0.04	0.175	5.445	4
5.439	1.592	0.16	0.02	0.158	5.445	4
5.487	1.392	0.18	0.01	0.177	5.507	4
5.483	1.200	0.16	0.00	0.158	5.527	4
5.484	1.013	0.18	0.02	0.180	5.549	4
5.479	0.838	0.20	0.02	0.198	5.542	3
5.491	0.634	0.19	0.03	0.195	5.527	3
5.465	0.429	0.21	0.02	0.211	5.481	3
5.470	0.237	0.21	0.02	0.210	5.475	3
5.490	0.034	0.21	0.01	0.214	5.490	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

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TABLE 7.11

VELOCITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

PARTICLE VELOCITIES AT SCALED TIME= 12.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
4.446	2.194	0.01	0.03	0.030	4.459	5
4.493	2.009	0.03	0.04	0.049	4.496	5
4.508	1.774	0.08	0.08	0.115	4.508	4
4.526	1.602	0.06	0.07	0.094	4.533	4
4.497	1.420	0.04	0.05	0.064	4.518	4
4.505	1.226	0.00	0.03	0.030	4.549	4
4.562	1.056	0.07	0.02	0.071	4.632	4
4.570	0.870	0.06	0.01	0.059	4.675	4
4.549	0.696	0.03	0.01	0.037	4.602	3
4.548	0.455	0.02	0.01	0.019	4.571	3
4.539	0.285	0.05	-0.01	0.052	4.548	3
4.569	0.069	0.01	0.02	0.018	4.570	3
4.634	2.212	0.02	0.02	0.025	4.648	5
4.659	2.031	0.02	0.01	0.022	4.663	5
4.642	1.781	0.05	0.04	0.065	4.643	4
4.670	1.624	0.07	0.06	0.091	4.676	4
4.676	1.424	0.07	0.06	0.093	4.696	4
4.684	1.249	0.05	0.06	0.082	4.723	4
4.722	1.057	0.08	0.04	0.085	4.789	4
4.737	0.870	0.06	0.03	0.069	4.839	4
4.722	0.668	0.03	0.02	0.038	4.769	3
4.729	0.477	0.02	0.02	0.028	4.753	3
4.732	0.280	0.01	0.00	0.011	4.740	3
4.732	0.077	0.01	0.01	0.017	4.732	3
4.807	2.177	0.05	0.02	0.053	4.817	5
4.820	1.972	0.04	0.01	0.040	4.822	5
4.809	1.776	0.06	0.03	0.068	4.810	4
4.831	1.586	0.08	0.05	0.096	4.839	4
4.831	1.399	0.08	0.05	0.096	4.853	4
4.842	1.211	0.08	0.05	0.099	4.885	4
4.885	0.849	0.08	0.04	0.090	4.958	3
4.909	0.649	0.09	0.02	0.096	4.952	3
4.873	0.441	0.04	0.00	0.043	4.893	3
4.887	0.273	0.05	0.02	0.050	4.895	3
4.893	0.067	0.06	0.01	0.061	4.894	3
4.984	2.199	0.06	0.02	0.065	4.996	5
4.980	2.005	0.05	0.01	0.056	4.982	5
4.986	1.777	0.06	0.03	0.063	4.987	4
4.983	1.562	0.08	0.05	0.091	4.992	4
5.005	1.402	0.08	0.06	0.098	5.026	4
5.008	1.210	0.09	0.07	0.111	5.050	4
5.019	1.047	0.09	0.06	0.108	5.083	4

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
5.042	0.817	0.09	0.04	0.094	5.108	3
5.052	0.623	0.07	0.02	0.077	5.090	3
5.054	0.452	0.07	0.02	0.078	5.074	3
5.061	0.271	0.08	0.01	0.078	5.068	3
5.070	0.081	0.08	0.01	0.080	5.071	3
5.136	2.176	0.08	0.03	0.082	5.146	5
5.194	1.973	0.08	0.02	0.084	5.195	5
5.139	1.788	0.06	0.03	0.069	5.139	4
5.156	1.585	0.08	0.05	0.092	5.163	4
5.191	1.401	0.08	0.06	0.096	5.211	4
5.171	1.196	0.09	0.06	0.102	5.213	4
5.199	1.021	0.10	0.05	0.114	5.266	4
5.199	0.851	0.08	0.05	0.093	5.268	3
5.215	0.637	0.10	0.03	0.106	5.254	3
5.214	0.451	0.11	0.02	0.109	5.234	3
5.235	0.260	0.09	0.01	0.091	5.241	3
5.210	0.072	0.10	0.02	0.099	5.210	3
5.309	2.168	0.09	0.03	0.097	5.318	5
5.332	1.977	0.10	0.03	0.102	5.333	5
5.309	1.770	0.08	0.02	0.086	5.310	4
5.298	1.558	0.09	0.04	0.096	5.307	4
5.343	1.401	0.10	0.05	0.114	5.362	4
5.366	1.178	0.12	0.05	0.133	5.408	4
5.358	1.025	0.15	0.06	0.164	5.423	4
5.376	0.833	0.13	0.05	0.141	5.440	3
5.400	0.677	0.13	0.03	0.138	5.442	3
5.393	0.437	0.14	0.04	0.142	5.415	3
5.366	0.235	0.12	0.02	0.125	5.371	3
5.396	0.053	0.11	0.01	0.111	5.396	3
5.441	2.192	0.11	0.04	0.120	5.451	5
5.451	1.982	0.11	0.03	0.117	5.452	5
5.489	1.777	0.11	0.03	0.110	5.489	4
5.480	1.598	0.10	0.02	0.104	5.487	4
5.536	1.399	0.13	0.04	0.134	5.555	4
5.530	1.205	0.12	0.04	0.123	5.568	4
5.537	1.024	0.14	0.04	0.149	5.599	4
5.536	0.846	0.15	0.03	0.153	5.601	3
5.547	0.645	0.15	0.03	0.151	5.584	3
5.525	0.437	0.15	0.02	0.150	5.543	3
5.529	0.241	0.15	0.00	0.151	5.534	3
5.551	0.037	0.16	0.00	0.160	5.551	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 7.12

VELOCITY FIELD DIPOLE WEST/8 WF5/295 SMOKE PUFF GRID 1220 /A780106

PARTICLE VELOCITIES AT SCALED TIME= 13.000 MS

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
4.639	2.224	0.04	0.06	0.074	4.653	5
4.669	2.042	0.06	0.06	0.090	4.672	5
4.654	1.802	0.01	0.08	0.082	4.654	4
4.683	1.645	-0.02	0.05	0.054	4.688	4
4.695	1.442	0.03	0.04	0.045	4.713	4
4.703	1.263	0.06	-0.01	0.063	4.740	4
4.743	1.062	0.06	-0.01	0.058	4.810	4
4.754	0.873	0.05	-0.02	0.051	4.855	4
4.732	0.667	0.05	-0.02	0.050	4.779	3
4.733	0.481	0.03	0.01	0.031	4.758	3
4.734	0.281	0.03	0.01	0.029	4.742	3
4.732	0.081	0.00	0.02	0.022	4.733	3
4.815	2.186	0.01	0.05	0.051	4.827	5
4.831	1.982	0.04	0.07	0.083	4.833	5
4.831	1.796	0.07	0.09	0.115	4.832	4
4.859	1.605	0.07	0.05	0.090	4.865	4
4.856	1.416	0.05	0.03	0.063	4.876	4
4.867	1.226	0.05	0.03	0.054	4.907	4
4.910	0.858	0.06	0.01	0.064	4.984	3
4.929	0.653	0.01	0.01	0.017	4.973	3
4.883	0.447	0.06	0.04	0.071	4.908	3
4.898	0.278	0.02	0.02	0.030	4.906	3
4.909	0.071	0.03	0.01	0.031	4.910	3
4.996	2.206	0.02	0.03	0.033	5.008	5
4.996	2.014	0.06	0.05	0.075	4.999	5
5.006	1.792	0.07	0.06	0.094	5.006	4
5.011	1.581	0.09	0.05	0.104	5.019	4
5.031	1.421	0.07	0.03	0.080	5.050	4
5.037	1.223	0.08	0.01	0.081	5.076	4
5.048	1.062	0.08	0.02	0.086	5.110	4
5.067	0.825	0.07	0.01	0.073	5.134	3
5.072	0.631	0.07	0.03	0.073	5.111	3
5.070	0.457	0.03	0.01	0.028	5.090	3
5.079	0.274	0.03	0.02	0.038	5.086	3
5.098	0.083	0.02	0.01	0.023	5.089	3
5.153	2.184	0.04	0.02	0.045	5.163	5

X-SCAL METERS	Y-SCAL METERS	U=DX/DT MACH NO	V=DY/DT MACH NO	PARTICLE VELOCITY	R-SCAL METERS	REGN CODE
5.215	1.979	0.06	0.02	0.066	5.216	5
5.159	1.802	0.08	0.06	0.099	5.159	4
5.184	1.606	0.10	0.05	0.111	5.190	4
5.211	1.421	0.06	0.04	0.073	5.229	4
5.193	1.217	0.07	0.05	0.086	5.232	4
5.226	1.035	0.08	0.03	0.085	5.291	4
5.215	0.865	0.05	0.02	0.057	5.309	4
5.239	0.642	0.06	0.01	0.059	5.278	3
5.240	0.457	0.06	0.03	0.068	5.260	3
5.255	0.262	0.05	0.01	0.050	5.261	3
5.236	0.077	0.06	0.00	0.062	5.236	3
5.334	2.177	0.07	0.03	0.079	5.343	5
5.360	1.984	0.08	0.02	0.081	5.361	5
5.336	1.780	0.09	0.04	0.098	5.337	4
5.329	1.575	0.11	0.06	0.126	5.336	4
5.375	1.419	0.09	0.05	0.106	5.392	4
5.399	1.198	0.08	0.04	0.090	5.439	4
5.399	1.042	0.06	0.02	0.067	5.460	4
5.409	0.845	0.07	0.02	0.071	5.475	3
5.433	0.685	0.07	0.02	0.072	5.476	3
5.428	0.446	0.04	0.00	0.039	5.446	3
5.398	0.241	0.07	0.01	0.070	5.403	3
5.424	0.053	0.08	-0.01	0.079	5.425	3
5.475	2.204	0.08	0.03	0.090	5.486	5
5.483	1.991	0.07	0.02	0.076	5.485	5
5.524	1.786	0.10	0.02	0.100	5.524	4
5.515	1.612	0.10	0.08	0.125	5.520	4
5.577	1.417	0.09	0.05	0.105	5.594	4
5.571	1.226	0.10	0.05	0.118	5.607	4
5.578	1.036	0.07	0.01	0.071	5.638	4
5.579	0.855	0.08	0.01	0.083	5.644	3
5.589	0.653	0.08	0.02	0.082	5.627	3
5.568	0.441	0.10	0.02	0.102	5.585	3
5.574	0.243	0.10	0.03	0.105	5.580	3
5.598	0.038	0.09	0.01	0.087	5.598	3

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
VELOCITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.1

DENSITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE DENSITIES AT SCALED TIME= 1.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.263	2.060	1.669	1.461	2	1.340	0.755	2.032	1.350	1	1.548	1.161	1.230	1.566	1
1.234	1.874	1.694	1.234	5	1.302	0.540	2.149	1.356	1	1.553	0.974	1.230	1.553	1
1.245	1.733	2.675	1.488	1	1.240	0.339	2.057	1.369	1	1.556	0.788	1.213	1.562	1
1.271	1.574	2.114	1.430	1	1.511	1.525	1.022	1.628	1	1.531	0.594	1.255	1.566	1
1.344	0.971	1.742	1.345	1	1.541	1.343	1.069	1.598	1	1.508	0.393	1.088	1.597	1

AVERAGE DENSITIES AT SCALED TIME= 2.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.564	2.021	1.603	1.745	2	1.781	0.538	1.487	1.822	1	2.104	2.054	1.247	2.113	5
1.518	1.886	2.333	1.518	5	1.759	0.333	1.856	1.854	1	2.094	1.860	1.246	2.094	5
1.548	1.779	1.531	1.550	4	1.940	2.078	2.914	1.953	5	2.105	1.667	1.208	2.114	4
1.597	0.967	0.866	1.598	1	1.947	1.887	1.993	1.947	5	2.097	1.491	1.268	2.173	1
1.597	0.732	1.014	1.608	1	1.925	1.695	1.741	1.931	4	2.106	1.328	1.293	2.145	1
1.587	0.498	1.217	1.641	1	1.907	1.530	1.518	2.003	1	2.109	1.133	1.400	2.120	1
1.553	0.308	1.447	1.669	1	1.928	1.359	1.689	1.978	1	2.111	0.939	1.468	2.111	1
1.758	2.052	1.842	1.917	2	1.957	1.162	1.566	1.972	1	2.112	0.757	1.305	2.119	1
1.785	1.901	1.454	1.785	5	1.959	0.962	1.553	1.959	1	2.105	0.569	1.287	2.134	1
1.766	1.747	1.683	1.770	4	1.958	0.764	1.731	1.965	1	2.097	0.381	1.237	2.155	1
1.783	1.187	1.343	1.803	1	1.941	0.558	1.938	1.974	1	2.081	0.202	1.104	2.091	3
1.798	0.974	1.364	1.799	1	1.914	0.365	2.123	1.993	1					
1.799	0.754	1.305	1.807	1	1.903	0.194	1.852	2.037	1					

AVERAGE DENSITIES AT SCALED TIME= 3.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
1.657	2.041	0.868	1.820	2	2.142	1.150	1.422	2.154	1	2.463	1.484	1.754	2.491	4
1.591	1.897	2.299	1.591	5	2.132	0.953	1.357	2.133	1	2.452	1.313	1.859	2.483	1
1.663	1.787	0.808	1.665	4	2.139	0.761	1.639	2.145	1	2.437	1.124	1.691	2.446	1
1.812	0.965	0.893	1.812	1	2.144	0.561	1.713	2.174	1	2.435	0.942	1.699	2.435	1
1.800	0.738	0.964	1.809	1	2.142	0.374	1.654	2.211	1	2.437	0.761	1.785	2.442	1
1.745	0.514	1.120	1.791	1	2.177	0.200	1.352	2.186	3	2.435	0.570	1.798	2.460	1
1.690	0.330	1.061	1.780	1	2.349	2.079	1.799	2.360	5	2.445	0.384	1.924	2.503	1
1.951	2.072	0.951	1.963	5	2.371	1.864	1.467	2.371	5	2.461	0.215	2.280	2.470	3
2.010	1.920	0.822	2.011	5	2.337	1.641	1.538	2.347	4	2.622	2.059	1.248	2.630	5
1.945	1.758	1.080	1.947	4	2.291	1.481	1.448	2.359	1	2.624	1.870	1.283	2.624	5
1.967	1.179	1.242	1.934	1	2.294	1.323	1.392	2.329	1	2.624	1.680	1.313	2.630	4
1.987	0.967	1.597	1.987	1	2.288	1.129	1.409	2.297	1	2.623	1.491	1.329	2.648	4
1.988	0.753	1.397	1.995	1	2.280	0.931	1.458	2.280	1	2.614	1.314	1.293	2.644	1
1.967	0.552	1.313	2.001	1	2.284	0.747	1.378	2.290	1	2.612	1.129	1.170	2.620	1
1.947	0.357	1.143	2.027	1	2.287	0.560	1.545	2.315	1	2.618	0.949	1.146	2.618	1
2.206	2.107	2.673	2.220	5	2.289	0.375	1.625	2.353	1	2.611	0.761	1.132	2.616	1
2.236	1.888	0.907	2.236	5	2.315	0.222	1.921	2.326	3	2.614	0.577	1.136	2.637	1
2.161	1.683	0.967	2.168	4	2.477	2.064	2.464	2.485	5	2.622	0.389	1.249	2.051	3
2.085	1.516	0.994	2.169	1	2.490	1.876	2.278	2.490	5	2.629	0.197	1.226	2.635	3
2.117	1.346	1.335	2.160	1	2.476	1.663	2.144	2.484	4					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.2

DENSITY FIELD DIPOLE WEST/8 WF5/295 SMOKE PUFF GRID 1220 /A780106

AVERAGE DENSITIES AT SCALED TIME= 4.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.101	1.192	1.003	2.119	1
2.145	0.964	1.191	2.145	1
2.143	0.750	1.031	2.150	1
2.101	0.536	1.085	2.136	1
2.057	0.331	1.006	2.140	1
2.345	2.117	1.972	2.360	5
2.392	1.888	0.606	2.392	5
2.279	1.675	0.722	2.286	4
2.172	1.519	0.320	2.253	1
2.235	1.349	1.113	2.276	1
2.298	1.143	1.229	2.309	1
2.314	0.954	1.227	2.314	1
2.320	0.768	1.376	2.325	1
2.295	0.564	1.454	2.322	1
2.270	0.370	1.375	2.335	1
2.314	0.196	1.083	2.322	3
2.559	1.860	1.065	2.559	5
2.442	1.305	1.110	2.472	1
2.453	1.113	1.368	2.461	1
2.463	0.927	1.586	2.463	1
2.464	0.753	1.433	2.470	1
2.454	0.574	1.302	2.478	1
2.440	0.387	1.156	2.497	1
2.478	0.230	1.508	2.489	3

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.708	1.878	1.453	2.708	5
2.632	1.286	1.306	2.658	1
2.616	1.100	1.473	2.622	1
2.614	0.930	1.627	2.614	1
2.621	0.762	1.656	2.626	1
2.625	0.587	1.532	2.645	1
2.634	0.400	1.337	2.664	3
2.672	0.234	1.433	2.682	3
2.828	2.083	1.517	2.837	5
2.823	1.881	1.732	2.828	5
2.830	1.659	1.648	2.837	4
2.832	1.451	1.401	2.861	4
2.814	1.282	1.316	2.872	4
2.785	1.111	1.383	2.791	1
2.777	0.935	1.495	2.777	1
2.778	0.763	1.545	2.782	1
2.785	0.586	1.522	2.805	1
2.809	0.409	1.667	2.839	3
2.833	0.214	1.573	2.841	3
2.965	2.072	1.871	2.972	5
2.961	1.871	1.311	2.961	5
2.967	1.670	1.495	2.973	4
2.975	1.477	1.756	2.999	4
2.971	1.290	2.152	3.025	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.943	1.115	1.780	2.950	1
2.932	0.938	1.653	2.932	1
2.934	0.756	1.741	2.939	1
2.938	0.580	1.691	2.995	3
2.960	0.396	1.756	2.987	3
2.974	0.208	1.652	2.981	3
3.101	2.073	1.468	3.108	5
3.110	1.877	1.374	3.110	5
3.114	1.682	1.463	3.119	4
3.110	1.496	1.481	3.131	4
3.104	1.305	1.335	3.153	4
3.094	1.122	1.303	3.180	4
3.086	0.936	1.224	3.086	1
3.087	0.752	1.208	3.092	1
3.096	0.569	1.207	3.148	3
3.106	0.391	1.322	3.130	3
3.113	0.196	1.409	3.120	3
3.252	2.052	1.016	3.258	5
3.261	1.853	1.062	3.261	5
3.257	1.657	1.037	3.264	4
3.260	1.478	1.014	3.282	4
3.258	1.299	1.025	3.306	4
3.258	1.119	1.024	3.341	4

AVERAGE DENSITIES AT SCALED TIME= 5.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.649	1.862	0.857	2.649	5
2.539	1.328	1.001	2.572	1
2.559	1.125	1.001	2.567	1
2.579	0.926	1.143	2.579	1
2.581	0.736	1.026	2.588	1
2.560	0.545	1.037	2.588	1
2.534	0.354	1.050	2.559	3
2.575	0.205	1.444	2.583	3
2.824	1.880	1.078	2.825	5
2.742	1.295	1.126	2.799	4
2.743	1.101	1.288	2.749	1
2.757	0.925	1.353	2.757	1
2.762	0.750	1.424	2.767	1
2.753	0.571	1.299	2.775	1
2.754	0.382	1.097	2.780	3
2.798	0.228	1.220	2.808	3
2.973	2.096	1.328	2.983	5
2.970	1.874	1.364	2.970	5
2.979	1.653	1.081	2.986	4
2.981	1.436	1.030	3.011	4
2.961	1.274	0.900	3.018	4
2.936	1.106	1.090	2.942	1
2.935	0.931	1.287	2.935	1
2.934	0.757	1.326	2.938	1
2.932	0.584	1.304	2.990	3
2.955	0.411	1.454	2.983	3
2.982	0.218	1.394	2.990	3
3.122	2.084	1.304	3.130	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.118	1.868	1.083	3.118	5
3.132	1.636	1.369	3.140	4
3.153	1.445	1.610	3.180	4
3.158	1.262	1.845	3.214	4
3.116	1.099	1.716	3.207	4
3.099	0.931	1.564	3.100	1
3.103	0.754	1.632	3.107	1
3.108	0.582	1.413	3.162	3
3.130	0.407	1.382	3.155	3
3.142	0.215	1.230	3.149	3
3.267	2.079	1.435	3.274	5
3.272	1.857	1.068	3.272	5
3.292	1.648	1.059	3.298	4
3.290	1.471	1.667	3.313	4
3.272	1.274	2.060	3.323	4
3.255	1.096	1.854	3.343	4
3.241	0.925	1.512	3.241	1
3.242	0.753	1.592	3.329	3
3.259	0.578	1.488	3.310	3
3.277	0.404	1.624	3.302	3
3.283	0.197	1.427	3.289	3
3.399	2.057	1.063	3.405	5
3.409	1.861	1.303	3.409	5
3.409	1.645	1.882	3.415	4
3.398	1.450	1.586	3.422	4
3.374	1.284	1.420	3.422	4
3.362	1.099	1.646	3.447	4
3.362	0.916	1.680	3.491	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.367	0.752	1.665	3.450	3
3.376	0.579	1.655	3.425	3
3.395	0.388	1.496	3.417	3
3.400	0.195	1.382	3.406	3
3.519	2.046	2.187	3.524	5
3.516	1.830	1.797	3.516	4
3.506	1.644	1.585	3.512	4
3.509	1.459	1.659	3.532	4
3.499	1.275	1.434	3.547	4
3.482	1.102	1.314	3.563	4
3.482	0.928	1.602	3.604	4
3.433	0.745	1.646	3.561	3
3.491	0.571	1.647	3.538	3
3.512	0.383	1.620	3.533	3
3.524	0.186	1.564	3.529	3
3.635	2.037	1.174	3.639	5
3.645	1.843	1.179	3.645	4
3.641	1.652	1.212	3.647	4
3.637	1.474	1.166	3.657	4
3.632	1.280	1.186	3.678	4
3.627	1.096	1.149	3.706	4
3.627	0.922	1.062	3.746	4
3.645	0.378	1.086	3.664	3
3.652	0.176	1.156	3.656	3
3.813	2.031	1.022	3.817	5
3.808	1.836	1.015	3.808	4

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.3

DENSITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE DENSITIES AT SCALED TIME= 6.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
2.898	1.896	1.055	2.898	5
2.814	1.318	0.929	2.865	4
2.811	1.118	0.969	2.818	1
2.826	0.926	0.977	2.826	1
2.830	0.735	1.089	2.836	1
2.822	0.542	1.090	2.847	1
2.837	0.356	1.042	2.859	3
3.048	2.110	1.302	3.059	5
3.050	1.880	1.179	3.050	5
3.068	1.670	0.984	3.074	4
3.066	1.459	1.060	3.091	4
3.046	1.296	0.885	3.098	4
3.031	1.123	0.915	3.038	1
3.033	0.933	0.980	3.033	1
3.025	0.739	1.057	3.031	1
3.020	0.557	1.095	3.071	3
3.053	0.386	1.395	3.078	3
3.087	0.202	1.346	3.094	3
3.207	2.096	1.091	3.216	5
3.208	1.880	0.981	3.208	5
3.232	1.640	1.338	3.239	4
3.247	1.451	1.382	3.272	4
3.262	1.276	1.429	3.313	4
3.235	1.111	1.385	3.320	4
3.220	0.933	1.187	3.220	1
3.218	0.743	1.289	3.303	3
3.218	0.565	1.190	3.267	3
3.244	0.393	1.192	3.268	3
3.255	0.206	1.174	3.262	3
3.371	2.092	1.184	3.379	5
3.378	1.861	0.906	3.378	5
3.401	1.649	0.861	3.408	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.409	1.469	1.374	3.432	4
3.406	1.279	1.483	3.454	4
3.397	1.103	1.520	3.479	4
3.384	0.927	1.228	3.510	4
3.381	0.746	1.211	3.462	3
3.394	0.572	1.243	3.442	3
3.409	0.398	1.357	3.432	3
3.410	0.192	1.246	3.415	3
3.523	2.067	0.840	3.529	5
3.534	1.866	1.048	3.534	5
3.536	1.641	1.608	3.542	4
3.539	1.451	1.386	3.562	4
3.523	1.288	1.291	3.569	4
3.516	1.099	1.535	3.597	4
3.518	0.918	1.453	3.641	4
3.525	0.751	1.395	3.604	3
3.529	0.576	1.437	3.576	3
3.538	0.383	1.338	3.558	3
3.535	0.191	1.291	3.540	3
3.670	2.057	1.505	3.675	5
3.667	1.828	1.210	3.667	4
3.653	1.645	1.236	3.659	4
3.662	1.456	1.425	3.684	4
3.660	1.266	1.171	3.707	4
3.642	1.096	1.180	3.721	4
3.651	0.925	1.442	3.768	4
3.654	0.747	1.381	3.729	3
3.655	0.573	1.396	3.700	3
3.663	0.384	1.383	3.684	3
3.666	0.182	1.386	3.671	3
3.782	2.040	1.402	3.786	5
3.800	1.849	1.379	3.800	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.790	1.642	1.342	3.796	4
3.777	1.466	1.424	3.797	4
3.779	1.265	1.560	3.825	4
3.773	1.086	1.619	3.851	4
3.771	0.916	1.620	3.887	4
3.778	0.752	1.573	3.853	3
3.778	0.577	1.497	3.822	3
3.779	0.382	1.445	3.798	3
3.734	0.174	1.378	3.788	3
3.908	2.041	1.564	3.913	5
3.911	1.841	1.652	3.911	4
3.901	1.636	1.616	3.907	4
3.894	1.449	1.740	3.915	4
3.895	1.265	1.544	3.940	4
3.894	1.085	1.518	3.970	4
3.896	0.910	1.562	4.009	4
3.902	0.741	1.605	3.971	3
3.901	0.557	1.517	3.940	3
3.897	0.361	1.440	3.914	3
3.916	0.150	1.490	3.919	3
4.034	2.041	1.453	4.038	5
4.029	1.834	1.445	4.029	4
4.023	1.642	1.341	4.029	4
4.027	1.460	1.287	4.046	4
4.033	1.283	1.316	4.074	4
4.033	1.093	1.368	4.105	4
4.030	0.917	1.308	4.138	4
4.033	0.745	1.334	4.101	3
4.038	0.552	1.311	4.076	3
4.038	0.349	1.251	4.053	3
4.054	0.165	1.184	4.058	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.4

DENSITY FIELD DIPOLE WEST/8 WFS/295 SMOKE PUFF GRID 1220 /A780106

AVERAGE DENSITIES AT SCALED TIME= 7.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.093	2.137	1.287	3.106	5
3.105	1.916	1.313	3.106	5
3.119	1.697	1.023	3.123	4
3.117	1.486	1.034	3.139	4
3.098	1.313	0.882	3.135	4
3.065	1.131	0.884	3.150	4
3.070	0.939	0.527	3.070	1
3.066	0.745	0.966	3.071	1
3.069	0.564	1.018	3.121	3
3.124	0.392	1.313	3.148	3
3.175	0.206	1.229	3.182	3
3.266	2.114	1.065	3.276	5
3.266	1.898	0.848	3.266	5
3.292	1.659	1.194	3.298	4
3.313	1.469	1.111	3.336	4
3.321	1.291	1.031	3.369	4
3.291	1.122	1.114	3.372	4
3.279	0.934	0.970	3.279	1
3.280	0.736	1.121	3.362	3
3.288	0.559	1.020	3.335	3
3.327	0.385	1.086	3.349	3
3.346	0.199	1.219	3.352	3
3.441	2.112	1.114	3.450	5
3.452	1.877	0.804	3.452	5
3.481	1.668	0.738	3.486	4
3.501	1.485	1.241	3.521	4
3.498	1.291	1.257	3.544	4
3.481	1.111	1.278	3.560	4
3.463	0.927	1.007	3.585	4
3.464	0.739	1.027	3.542	3
3.486	0.561	1.068	3.531	3
3.503	0.380	1.152	3.523	3
3.509	0.184	1.265	3.514	3
3.604	2.081	0.778	3.611	5
3.622	1.883	0.939	3.622	5
3.630	1.655	1.526	3.635	4
3.639	1.467	1.224	3.660	4
3.627	1.296	1.130	3.670	4
3.617	1.105	1.294	3.694	4
3.614	0.919	1.193	3.733	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.625	0.744	1.169	3.700	3
3.633	0.564	1.239	3.677	3
3.641	0.368	1.254	3.659	3
3.640	0.179	1.292	3.645	3
3.760	2.067	1.491	3.765	5
3.760	1.842	1.219	3.760	4
3.752	1.660	1.129	3.757	4
3.769	1.466	1.330	3.789	4
3.772	1.274	1.072	3.817	4
3.761	1.099	0.998	3.836	4
3.769	0.927	1.105	3.882	4
3.772	0.741	1.088	3.844	3
3.772	0.558	1.201	3.813	3
3.777	0.367	1.196	3.795	3
3.777	0.173	1.304	3.781	3
3.885	2.046	1.137	3.890	5
3.908	1.856	1.133	3.908	5
3.901	1.653	1.081	3.906	4
3.898	1.473	1.133	3.916	4
3.908	1.272	1.176	3.951	4
3.911	1.091	1.301	3.985	4
3.912	0.915	1.353	4.024	4
3.920	0.746	1.138	3.990	3
3.912	0.564	1.184	3.953	3
3.906	0.364	1.300	3.923	3
3.907	0.161	1.211	3.911	3
4.035	2.043	1.284	4.040	5
4.037	1.842	1.397	4.037	4
4.024	1.636	1.607	4.030	4
4.030	1.447	1.634	4.051	4
4.044	1.267	1.386	4.087	4
4.047	1.083	1.291	4.121	4
4.052	0.909	1.366	4.162	4
4.055	0.737	1.587	4.122	3
4.040	0.545	1.462	4.077	3
4.030	0.348	1.368	4.045	3
4.034	0.150	1.805	4.036	3
4.167	2.035	1.465	4.171	5
4.167	1.830	1.228	4.167	4
4.155	1.634	1.160	4.161	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.158	1.459	1.352	4.177	4
4.169	1.274	1.721	4.210	4
4.180	1.084	1.638	4.251	4
4.179	0.909	1.498	4.286	4
4.181	0.739	1.389	4.245	3
4.175	0.545	1.283	4.211	3
4.165	0.342	1.339	4.179	3
4.168	0.154	1.113	4.170	3
4.286	2.058	1.648	4.291	5
4.290	1.846	1.812	4.290	4
4.291	1.647	1.830	4.296	4
4.292	1.467	1.646	4.309	4
4.285	1.287	1.497	4.322	4
4.297	1.104	1.580	4.363	4
4.307	0.924	1.702	4.407	4
4.307	0.752	1.651	4.372	3
4.299	0.554	1.643	4.335	3
4.298	0.356	1.618	4.313	3
4.298	0.171	1.501	4.301	3
4.417	2.048	1.294	4.421	5
4.408	1.842	1.194	4.408	4
4.419	1.652	1.181	4.423	4
4.419	1.469	1.236	4.436	4
4.419	1.286	1.279	4.456	4
4.425	1.104	1.318	4.488	4
4.428	0.921	1.345	4.526	4
4.427	0.736	1.314	4.488	3
4.424	0.555	1.328	4.459	3
4.423	0.366	1.381	4.438	3
4.431	0.169	1.310	4.434	3
4.579	2.039	1.044	4.582	5
4.580	1.846	1.049	4.580	4
4.580	1.646	1.070	4.585	4
4.577	1.459	1.080	4.595	4
4.577	1.277	1.077	4.613	4
4.575	1.096	1.080	4.638	4
4.581	0.907	1.077	4.678	4
4.579	0.727	1.074	4.636	3
4.582	0.543	1.050	4.614	3
4.592	0.172	1.009	4.596	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.5

DENSITY FIELD　　DIPOLE #EST/8　　#F5/295　　SMOKE PUFF GRID 1220　　/A780106

AVERAGE DENSITIES AT SCALED TIME=　8.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.325	2.133	1.005	3.337	5	3.870	0.169	1.214	3.874	3	4.431	1.107	1.270	4.494	4
3.360	1.474	1.051	3.381	4	3.954	2.052	1.062	3.960	5	4.441	0.921	1.370	4.538	4
3.368	1.293	1.035	3.415	4	3.981	1.872	1.065	3.981	5	4.440	0.739	1.239	4.501	3
3.325	1.125	1.111	3.404	4	3.978	1.671	0.963	3.983	4	4.429	0.539	1.284	4.462	3
3.310	0.943	0.977	3.310	1	3.978	1.484	0.965	3.996	4	4.426	0.345	1.362	4.439	3
3.318	0.751	1.107	3.402	3	3.993	1.279	1.022	4.034	4	4.426	0.161	1.334	4.429	3
3.334	0.578	0.981	3.393	3	3.995	1.088	1.097	4.068	4	4.535	2.046	1.335	4.539	5
3.386	0.407	1.001	3.411	3	3.995	0.911	1.163	4.106	4	4.530	1.844	1.093	4.530	4
3.419	0.212	1.042	3.426	3	4.007	0.741	0.966	4.075	3	4.539	1.649	1.242	4.543	4
3.498	2.132	1.193	3.509	5	4.002	0.557	1.074	4.041	3	4.542	1.465	1.380	4.559	4
3.554	1.496	1.113	3.572	4	4.002	0.358	1.172	4.018	3	4.548	1.287	1.504	4.584	4
3.545	1.296	1.145	3.589	4	4.006	0.156	1.073	4.009	3	4.560	1.094	1.453	4.623	4
3.521	1.113	1.196	3.599	4	4.115	2.052	1.157	4.120	5	4.557	0.908	1.454	4.665	4
3.499	0.932	0.954	3.620	4	4.120	1.855	1.277	4.120	5	4.570	0.725	1.250	4.627	3
3.508	0.746	0.987	3.587	3	4.113	1.651	1.473	4.118	4	4.565	0.536	1.339	4.596	3
3.544	0.571	1.026	3.590	3	4.123	1.458	1.421	4.142	4	4.558	0.348	1.486	4.571	3
3.574	0.393	1.094	3.595	3	4.141	1.272	1.198	4.182	4	4.560	0.158	1.407	4.563	3
3.597	0.191	1.159	3.592	3	4.146	1.084	1.126	4.217	4	4.672	2.035	1.440	4.675	5
3.654	2.101	0.742	3.672	5	4.155	0.906	1.162	4.262	4	4.673	1.835	1.421	4.674	4
3.638	1.906	0.891	3.688	5	4.156	0.726	1.399	4.220	3	4.670	1.635	1.393	4.676	4
3.695	1.672	1.434	3.699	4	4.142	0.535	1.315	4.176	3	4.671	1.448	1.470	4.689	4
3.699	1.479	1.099	3.719	4	4.135	0.341	1.296	4.149	3	4.674	1.272	1.376	4.710	4
3.682	1.302	1.011	3.724	4	4.143	0.145	1.689	4.145	3	4.675	1.087	1.371	4.738	4
3.666	1.107	1.142	3.742	4	4.257	2.041	1.356	4.261	5	4.690	0.901	1.585	4.787	4
3.661	0.917	1.090	3.779	4	4.264	1.838	1.092	4.264	4	4.694	0.713	1.412	4.747	3
3.680	0.744	1.087	3.755	3	4.257	1.645	0.997	4.262	4	4.690	0.525	1.449	4.719	3
3.701	0.569	1.147	3.744	3	4.264	1.470	1.163	4.281	4	4.686	0.345	1.485	4.698	3
3.719	0.373	1.149	3.738	3	4.279	1.278	1.495	4.318	4	4.686	0.162	1.432	4.689	3
3.724	0.180	1.144	3.729	3	4.295	1.087	1.426	4.363	4	4.810	2.035	1.453	4.813	5
3.824	2.034	1.571	3.830	5	4.295	0.907	1.198	4.399	4	4.806	1.842	1.468	4.806	4
3.826	1.861	1.193	3.828	5	4.295	0.727	1.205	4.356	3	4.806	1.641	1.473	4.811	4
3.820	1.678	1.034	3.825	4	4.286	0.534	1.182	4.319	3	4.809	1.457	1.546	4.825	4
3.837	1.477	1.173	3.856	4	4.278	0.331	1.243	4.291	3	4.805	1.274	1.590	4.841	4
3.841	1.278	0.902	3.885	4	4.285	0.147	1.030	4.237	3	4.811	1.091	1.615	4.872	4
3.827	1.098	0.826	3.902	4	4.390	2.061	1.439	4.395	5	4.812	0.919	1.609	4.902	4
3.830	0.922	0.973	3.943	4	4.404	1.855	1.496	4.404	5	4.814	0.719	1.587	4.868	3
3.843	0.738	0.980	3.913	3	4.411	1.651	1.628	4.415	4	4.817	0.528	1.707	4.845	3
3.852	0.557	1.116	3.892	3	4.414	1.471	1.410	4.431	4	4.819	0.346	1.548	4.832	3
3.863	0.365	1.093	3.880	3	4.411	1.289	1.188	4.448	4	4.818	0.166	1.515	4.821	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.6

DENSITY FIELD   DIPOLE WEST/8   WFS/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE DENSITIES AT SCALED TIME=   9.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.538	2.147	1.151	3.550	5
3.571	1.493	1.091	3.590	4
3.567	1.298	1.090	3.611	4
3.548	1.121	1.278	3.623	4
3.529	0.950	1.013	3.644	4
3.541	0.769	0.960	3.623	3
3.584	0.597	0.971	3.633	3
3.616	0.416	0.935	3.639	3
3.629	0.199	0.980	3.634	3
3.699	2.118	0.729	3.708	5
3.722	1.918	0.937	3.723	5
3.726	1.675	1.172	3.730	4
3.727	1.483	1.001	3.746	4
3.712	1.304	0.953	3.753	4
3.697	1.112	1.091	3.772	4
3.693	0.931	1.085	3.807	4
3.718	0.763	1.092	3.795	3
3.749	0.592	1.096	3.796	3
3.773	0.391	1.045	3.793	3
3.777	0.192	0.990	3.782	3
3.864	2.097	1.313	3.871	5
3.871	1.878	1.004	3.871	5
3.863	1.689	0.934	3.867	4
3.876	1.482	1.059	3.894	4
3.882	1.280	0.814	3.925	4
3.867	1.101	0.790	3.940	4
3.867	0.927	1.012	3.977	4
3.887	0.753	0.962	3.959	3
3.906	0.574	1.052	3.948	3
3.923	0.381	1.018	3.941	3
3.936	0.176	1.056	3.940	3
4.005	2.082	1.032	4.011	5
4.035	1.890	1.021	4.035	5
4.030	1.683	0.895	4.033	4
4.027	1.491	0.865	4.043	4
4.041	1.284	0.937	4.082	4
4.038	1.086	1.053	4.111	4
4.041	0.914	1.101	4.150	4
4.059	0.752	0.935	4.128	3
4.061	0.571	1.042	4.101	3
4.069	0.370	1.066	4.086	3
4.080	0.163	0.961	4.083	3
4.173	2.074	1.064	4.178	5
4.179	1.876	1.174	4.179	5

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.171	1.667	1.293	4.175	4
4.181	1.468	1.265	4.199	4
4.197	1.274	1.061	4.238	4
4.198	1.086	1.012	4.269	4
4.213	0.908	1.082	4.318	4
4.219	0.732	1.317	4.282	3
4.209	0.545	1.211	4.244	3
4.209	0.351	1.217	4.224	3
4.224	0.151	1.512	4.227	3
4.320	2.062	1.328	4.325	5
4.332	1.858	1.013	4.332	5
4.326	1.661	0.889	4.330	4
4.332	1.480	1.023	4.348	4
4.345	1.283	1.327	4.383	4
4.361	1.088	1.300	4.429	4
4.367	0.908	1.036	4.469	4
4.369	0.729	1.098	4.429	3
4.363	0.536	1.098	4.396	3
4.363	0.336	1.135	4.376	3
4.375	0.149	0.939	4.378	3
4.460	2.078	1.347	4.465	5
4.479	1.873	1.357	4.479	5
4.488	1.665	1.509	4.493	4
4.494	1.482	1.267	4.509	4
4.490	1.294	1.026	4.525	4
4.510	1.109	1.141	4.572	4
4.523	0.920	1.271	4.619	4
4.524	0.735	1.136	4.584	3
4.517	0.536	1.185	4.548	3
4.520	0.345	1.248	4.533	3
4.522	0.159	1.254	4.525	3
4.614	2.060	1.278	4.618	5
4.614	1.858	0.997	4.614	5
4.627	1.663	1.092	4.631	4
4.635	1.477	1.160	4.650	4
4.642	1.292	1.240	4.677	4
4.653	1.095	1.201	4.715	4
4.663	0.906	1.204	4.759	4
4.668	0.720	1.041	4.723	3
4.665	0.531	1.211	4.695	3
4.661	0.344	1.362	4.674	3
4.666	0.155	1.248	4.668	3
4.759	2.047	1.320	4.763	5
4.766	1.848	1.340	4.766	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.770	1.647	1.288	4.775	4
4.776	1.457	1.316	4.793	4
4.782	1.277	1.192	4.817	4
4.784	1.088	1.221	4.845	4
4.800	0.898	1.378	4.895	4
4.804	0.705	1.308	4.855	3
4.801	0.517	1.345	4.828	3
4.797	0.339	1.364	4.809	3
4.803	0.157	1.340	4.805	3
4.913	2.038	1.257	4.917	5
4.916	1.852	1.181	4.916	5
4.913	1.646	1.324	4.918	4
4.930	1.460	1.314	4.946	4
4.934	1.278	1.237	4.968	4
4.933	1.092	1.410	4.992	4
4.935	0.912	1.308	5.025	4
4.940	0.710	1.301	4.990	3
4.936	0.517	1.516	4.963	3
4.938	0.335	1.476	4.950	3
4.938	0.159	1.528	4.940	3
5.056	2.027	1.384	5.059	5
5.063	1.836	1.329	5.063	4
5.052	1.647	1.342	5.056	4
5.062	1.460	1.494	5.078	4
5.076	1.269	1.375	5.110	4
5.075	1.089	1.385	5.132	4
5.080	0.911	1.324	5.167	4
5.077	0.727	1.290	5.129	3
5.082	0.531	1.246	5.109	3
5.072	0.332	1.347	5.083	3
5.070	0.142	1.344	5.072	3
5.135	2.039	1.273	5.188	5
5.193	1.836	1.266	5.193	4
5.188	1.644	1.245	5.192	4
5.198	1.468	1.268	5.213	4
5.206	1.277	1.201	5.239	4
5.213	1.088	1.315	5.270	4
5.212	0.918	1.245	5.295	4
5.220	0.737	1.245	5.271	3
5.214	0.541	1.276	5.242	3
5.201	0.332	1.275	5.212	3
5.202	0.141	1.298	5.203	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

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TABLE 8.7

DENSITY FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE DENSITIES AT SCALED TIME= 10.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
3.711	2.130	0.739	3.721	5
3.725	1.911	0.955	3.725	5
3.733	1.677	0.952	3.737	4
3.744	1.488	0.947	3.762	4
3.738	1.312	0.944	3.778	4
3.732	1.129	1.074	3.802	4
3.724	0.960	1.059	3.830	4
3.748	0.790	1.074	3.831	3
3.778	0.613	0.968	3.828	3
3.793	0.406	0.925	3.815	3
3.793	0.203	0.922	3.799	3
3.879	2.102	1.004	3.887	5
3.888	1.887	0.852	3.898	5
3.886	1.693	0.888	3.890	4
3.898	1.487	1.078	3.916	4
3.909	1.289	0.863	3.950	4
3.902	1.118	0.871	3.972	4
3.902	0.951	1.067	4.005	4
3.919	0.783	0.912	3.997	3
3.941	0.597	0.979	3.986	3
3.956	0.398	0.935	3.975	3
3.964	0.187	0.905	3.968	3
4.038	2.096	0.949	4.045	5
4.068	1.899	0.967	4.068	5
4.058	1.687	0.834	4.062	4
4.056	1.494	0.788	4.072	4
4.072	1.294	0.927	4.111	4
4.070	1.102	1.085	4.139	4
4.078	0.936	1.122	4.181	4
4.098	0.778	0.894	4.171	3
4.101	0.593	0.962	4.143	3
4.111	0.384	0.951	4.129	3
4.124	0.175	0.882	4.127	3
4.214	2.090	0.994	4.220	5
4.215	1.887	1.073	4.215	5
4.204	1.672	1.257	4.208	4
4.217	1.473	1.313	4.234	4
4.235	1.279	1.086	4.274	4
4.234	1.097	0.999	4.301	4
4.253	0.925	1.100	4.353	4
4.264	0.753	1.283	4.330	3

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.254	0.564	1.123	4.292	3
4.258	0.365	1.119	4.274	3
4.277	0.160	1.406	4.280	3
4.367	2.080	1.258	4.373	5
4.375	1.871	0.920	4.375	5
4.366	1.669	0.806	4.370	4
4.371	1.485	0.943	4.387	4
4.384	1.290	1.257	4.421	4
4.402	1.094	1.284	4.467	4
4.413	0.920	0.993	4.512	4
4.419	0.744	1.058	4.481	3
4.416	0.551	1.027	4.450	3
4.419	0.349	1.062	4.432	3
4.434	0.157	0.855	4.437	3
4.512	2.097	1.251	4.519	5
4.530	1.890	1.255	4.530	5
4.536	1.676	1.453	4.539	4
4.540	1.490	1.221	4.555	4
4.535	1.298	0.947	4.569	4
4.558	1.115	1.083	4.618	4
4.578	0.928	1.201	4.671	4
4.582	0.745	1.069	4.643	3
4.578	0.547	1.079	4.611	3
4.586	0.355	1.128	4.600	3
4.589	0.167	1.120	4.592	3
4.672	2.079	1.209	4.678	5
4.673	1.873	0.902	4.673	5
4.683	1.674	0.964	4.687	4
4.691	1.486	1.012	4.706	4
4.700	1.296	1.073	4.733	4
4.712	1.101	1.101	4.773	4
4.726	0.913	1.137	4.819	4
4.736	0.728	0.957	4.791	3
4.737	0.540	1.124	4.767	3
4.737	0.351	1.281	4.750	3
4.743	0.160	1.126	4.746	3
4.824	2.067	1.234	4.829	5
4.833	1.864	1.236	4.833	5
4.837	1.660	1.177	4.841	4
4.844	1.466	1.192	4.860	4
4.852	1.283	1.095	4.886	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.854	1.092	1.124	4.914	4
4.873	0.902	1.249	4.966	4
4.881	0.710	1.245	4.932	3
4.881	0.523	1.230	4.909	3
4.882	0.343	1.257	4.894	3
4.890	0.161	1.191	4.893	3
4.937	2.057	1.168	4.991	5
4.991	1.870	1.031	4.991	5
4.988	1.660	1.211	4.992	4
5.007	1.470	1.202	5.021	4
5.010	1.284	1.164	5.043	4
5.010	1.092	1.304	5.068	4
5.012	0.910	1.284	5.101	4
5.024	0.710	1.273	5.074	3
5.024	0.520	1.403	5.051	3
5.031	0.338	1.395	5.042	3
5.035	0.161	1.389	5.038	3
5.140	2.046	1.231	5.144	5
5.149	1.851	1.161	5.149	4
5.138	1.660	1.188	5.141	4
5.151	1.469	1.250	5.166	4
5.166	1.274	1.126	5.199	4
5.163	1.088	1.110	5.220	4
5.171	0.908	1.129	5.257	4
5.171	0.725	1.103	5.221	3
5.182	0.529	1.106	5.209	3
5.175	0.334	1.225	5.186	3
5.175	0.141	1.204	5.177	3
5.275	2.051	1.257	5.278	5
5.287	1.846	1.209	5.287	4
5.284	1.654	1.152	5.288	4
5.305	1.474	1.079	5.319	4
5.322	1.283	0.944	5.353	4
5.327	1.092	1.071	5.381	4
5.321	0.916	1.071	5.404	4
5.332	0.733	1.050	5.382	3
5.327	0.536	1.172	5.354	3
5.314	0.324	1.142	5.324	3
5.318	0.136	1.190	5.319	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
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OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.8

DENSITY FIELD   DIPOLE WEST/8   WES/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE DENSITIES AT SCALED TIME= 11.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.100	1.121	1.026	4.166	4
4.109	0.952	1.058	4.207	4
4.125	0.391	0.381	4.144	3
4.223	1.673	1.253	4.227	4
4.266	1.117	1.016	4.330	4
4.288	0.946	1.077	4.383	4
4.282	0.372	1.045	4.298	3
4.394	2.085	1.182	4.399	5
4.399	1.873	0.876	4.399	5
4.390	1.673	0.798	4.394	4
4.398	1.493	0.947	4.413	4
4.413	1.303	1.244	4.448	4
4.435	1.113	1.283	4.497	4
4.450	0.941	0.967	4.543	4
4.453	0.764	1.034	4.518	3
4.447	0.566	0.970	4.483	3
4.447	0.360	1.025	4.462	3
4.465	0.163	0.778	4.468	3
4.545	2.108	1.133	4.552	5
4.560	1.896	1.173	4.560	5
4.564	1.682	1.400	4.568	4
4.570	1.498	1.222	4.584	4
4.566	1.310	0.958	4.599	4
4.593	1.130	1.105	4.650	4
4.619	0.946	1.143	4.708	4
4.623	0.763	1.010	4.685	3
4.617	0.564	0.980	4.651	3

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.625	0.367	1.017	4.639	3
4.627	0.177	1.002	4.631	3
4.712	2.093	1.123	4.718	5
4.710	1.883	0.842	4.710	5
4.717	1.681	0.924	4.720	4
4.725	1.494	0.975	4.738	4
4.733	1.305	1.022	4.766	4
4.783	0.743	0.914	4.840	3
4.784	0.553	1.041	4.816	3
4.784	0.361	1.236	4.797	3
4.790	0.169	1.044	4.793	3
4.870	2.082	1.155	4.875	5
4.877	1.874	1.142	4.877	5
4.878	1.668	1.100	4.882	4
4.883	1.472	1.137	4.898	4
4.893	1.291	1.054	4.925	4
4.935	0.723	1.128	4.988	3
4.936	0.532	1.098	4.965	3
4.938	0.353	1.164	4.951	3
4.946	0.167	1.060	4.948	3
5.040	2.073	1.081	5.045	5
5.042	1.884	1.004	5.042	5
5.036	1.667	1.123	5.040	4
5.054	1.475	1.126	5.068	4
5.050	1.290	1.085	5.091	4
5.062	1.100	1.245	5.118	4
5.070	0.919	1.211	5.156	4

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
5.086	0.719	1.213	5.137	3
5.091	0.530	1.325	5.118	3
5.099	0.348	1.267	5.111	3
5.103	0.169	1.206	5.106	3
5.200	2.065	1.141	5.205	5
5.206	1.864	1.075	5.206	5
5.192	1.670	1.083	5.195	4
5.207	1.474	1.151	5.221	4
5.225	1.278	1.044	5.257	4
5.224	1.093	1.068	5.280	4
5.235	0.915	1.073	5.319	4
5.241	0.734	1.059	5.292	3
5.256	0.539	1.028	5.284	3
5.251	0.343	1.169	5.263	3
5.252	0.144	1.102	5.254	3
5.340	2.069	1.189	5.344	5
5.353	1.860	1.082	5.353	5
5.351	1.667	1.013	5.355	4
5.375	1.481	0.928	5.388	4
5.395	1.288	0.824	5.425	4
5.400	1.096	0.957	5.453	4
5.395	0.921	0.972	5.476	4
5.411	0.740	0.980	5.461	3
5.407	0.542	1.104	5.435	3
5.396	0.327	1.032	5.406	3
5.405	0.139	1.078	5.407	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 8.9

DENSITY FIELD   DIPOLE WEST/8   WFS/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE DENSITIES AT SCALED TIME= 12.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.557	2.113	1.074	4.564	5	4.901	1.881	1.120	4.901	5	5.226	1.678	1.046	5.229	4
4.576	1.903	1.181	4.577	5	4.904	1.678	1.106	4.907	4	5.245	1.485	1.128	5.259	4
4.586	1.694	1.377	4.588	4	4.911	1.435	1.146	4.925	4	5.269	1.290	0.991	5.299	4
4.594	1.514	1.189	4.606	4	4.922	1.306	1.047	4.953	4	5.272	1.103	1.038	5.325	4
4.589	1.330	0.963	4.619	4	4.972	0.736	1.066	5.026	3	5.285	0.931	0.977	5.365	4
4.619	1.149	1.103	4.673	4	4.969	0.538	1.026	4.998	3	5.293	0.748	0.976	5.345	3
4.643	0.963	1.100	4.733	4	4.970	0.360	1.080	4.983	3	5.310	0.551	0.953	5.339	3
4.646	0.775	0.976	4.711	3	4.977	0.173	0.978	4.980	3	5.304	0.351	1.083	5.316	3
4.674	0.573	0.939	4.669	3	5.074	2.083	0.995	5.079	5	5.301	0.150	1.033	5.303	3
4.639	0.373	0.965	4.654	3	5.073	1.892	0.951	5.073	5	5.334	2.082	1.145	5.389	5
4.642	0.181	0.987	4.645	3	5.066	1.675	1.092	5.069	4	5.395	1.869	1.021	5.395	5
4.732	2.099	1.028	4.738	5	5.086	1.487	1.098	5.100	4	5.392	1.675	0.964	5.395	4
4.729	1.890	0.833	4.730	5	5.095	1.304	1.034	5.125	4	5.418	1.489	0.909	5.431	4
4.741	1.692	0.940	4.744	4	5.100	1.117	1.196	5.154	4	5.441	1.298	0.819	5.470	4
4.751	1.509	0.973	4.764	4	5.110	0.936	1.127	5.193	4	5.450	1.107	1.020	5.502	4
4.759	1.320	0.991	4.789	4	5.128	0.732	1.110	5.180	3	5.451	0.934	0.952	5.528	4
4.813	0.755	0.333	4.872	3	5.135	0.541	1.210	5.163	3	5.458	0.752	0.976	5.519	3
4.810	0.563	0.932	4.843	3	5.142	0.357	1.142	5.154	3	5.466	0.552	1.080	5.494	3
4.803	0.367	1.168	4.817	3	5.144	0.174	1.106	5.147	3	5.454	0.333	0.966	5.464	3
4.811	0.174	0.953	4.814	3	5.241	2.077	1.083	5.246	5	5.462	0.143	1.024	5.464	3
4.897	2.090	1.093	4.902	5	5.244	1.873	1.023	5.244	5					

AVERAGE DENSITIES AT SCALED TIME= 13.000 MS

X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	DENSITY RATIO	R-SCAL METERS	REGN CODE
4.740	2.110	1.013	4.747	5	4.992	0.177	0.944	4.995	3	5.302	1.125	0.942	5.352	4
4.742	1.905	0.843	4.742	5	5.091	2.090	0.969	5.096	5	5.314	0.945	0.875	5.392	4
4.760	1.712	0.869	4.762	4	5.091	1.903	0.963	5.092	5	5.319	0.758	0.875	5.373	3
4.772	1.529	0.879	4.784	4	5.089	1.693	1.111	5.092	4	5.339	0.558	0.920	5.368	3
4.781	1.336	0.933	4.809	4	5.111	1.507	1.113	5.123	4	5.331	0.355	1.001	5.343	3
4.831	0.759	0.772	4.890	3	5.119	1.324	1.071	5.147	4	5.328	0.154	0.978	5.330	3
4.823	0.565	0.886	4.856	3	5.128	1.134	1.189	5.178	4	5.414	2.092	1.063	5.419	5
4.811	0.371	1.085	4.825	3	5.135	0.949	1.140	5.214	4	5.426	1.878	0.979	5.426	5
4.819	0.176	0.895	4.822	3	5.150	0.739	1.101	5.203	3	5.423	1.688	0.958	5.426	4
4.909	2.098	1.063	4.915	5	5.156	0.546	1.148	5.185	3	5.453	1.506	0.884	5.464	4
4.919	1.895	1.147	4.919	5	5.162	0.362	1.081	5.174	3	5.478	1.317	0.786	5.504	4
4.928	1.696	1.123	4.931	4	5.164	0.177	1.077	5.167	3	5.490	1.125	0.952	5.538	4
4.937	1.504	1.124	4.950	4	5.264	2.085	1.020	5.269	5	5.490	0.945	0.897	5.565	4
4.948	1.323	1.014	4.977	4	5.268	1.883	0.999	5.268	5	5.505	0.761	0.902	5.558	3
4.994	0.743	1.046	5.049	3	5.253	1.694	1.048	5.255	4	5.503	0.559	0.993	5.531	3
4.987	0.544	1.011	5.017	3	5.272	1.503	1.071	5.284	4	5.491	0.339	0.872	5.502	3
4.985	0.364	1.046	4.998	3	5.295	1.310	0.932	5.324	4	5.500	0.144	0.910	5.502	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
DENSITY IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT DENSITY.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
DENSITY VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.1

PRESSURE FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 1.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.263	2.060	1.819	1.461	2	1.340	0.755	3.207	1.350	1	1.548	1.161	0.597	1.566	1
1.234	1.874	1.805	1.234	5	1.302	0.540	3.393	1.356	1	1.553	0.974	0.609	1.553	1
1.245	1.733	4.601	1.488	1	1.240	0.339	2.890	1.369	1	1.536	0.788	0.579	1.562	1
1.271	1.574	2.833	1.430	1	1.511	1.525	0.195	1.628	1	1.531	0.594	0.640	1.566	1
1.344	0.971	2.342	1.345	1	1.541	1.343	0.297	1.598	1	1.508	0.393	0.321	1.597	1

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 2.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.564	2.021	1.274	1.745	2	1.781	0.538	1.080	1.822	1	2.104	2.054	0.531	2.113	5
1.518	1.886	3.392	1.518	5	1.759	0.333	1.793	1.854	1	2.094	1.860	0.543	2.094	5
1.548	1.779	1.562	1.550	4	1.940	2.078	4.199	1.953	5	2.105	1.667	0.452	2.114	4
1.597	0.967	0.254	1.598	1	1.947	1.887	2.144	1.947	5	2.097	1.491	0.490	2.173	1
1.597	0.732	0.539	1.608	1	1.925	1.695	1.492	1.931	4	2.106	1.328	0.512	2.145	1
1.587	0.498	0.980	1.641	1	1.907	1.530	0.952	2.003	1	2.109	1.133	0.692	2.120	1
1.553	0.308	1.376	1.669	1	1.928	1.359	1.275	1.978	1	2.111	0.939	0.803	2.111	1
1.768	2.052	1.749	1.917	2	1.957	1.162	1.048	1.972	1	2.112	0.757	0.532	2.119	1
1.785	1.901	1.019	1.785	5	1.959	0.962	1.021	1.959	1	2.105	0.569	0.499	2.134	1
1.766	1.747	1.439	1.770	4	1.958	0.764	1.353	1.965	1	2.087	0.381	0.413	2.155	1
1.783	1.187	0.806	1.803	1	1.941	0.558	1.751	1.974	1	2.081	0.202	0.259	2.091	3
1.798	0.974	0.851	1.799	1	1.914	0.365	2.106	1.993	1					
1.799	0.754	0.749	1.807	1	1.903	0.194	1.676	2.037	1					

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 3.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
1.657	2.041	-0.037	1.820	2	2.142	1.150	0.789	2.154	1	2.463	1.484	1.328	2.491	4
1.591	1.597	3.302	1.591	5	2.132	0.953	0.674	2.133	1	2.452	1.313	1.458	2.433	1
1.663	1.787	0.047	1.665	4	2.139	0.761	1.178	2.145	1	2.437	1.124	1.154	2.446	1
1.812	0.965	0.310	1.812	1	2.144	0.561	1.314	2.174	1	2.435	0.942	1.170	2.435	1
1.800	0.738	0.481	1.809	1	2.142	0.374	1.190	2.211	1	2.437	0.761	1.324	2.442	1
1.745	0.514	0.763	1.791	1	2.177	0.200	0.723	2.186	3	2.435	0.570	1.346	2.460	1
1.680	0.330	0.538	1.780	1	2.349	2.079	1.557	2.360	5	2.445	0.384	1.610	2.503	1
1.951	2.072	0.104	1.963	5	2.371	1.864	0.940	2.371	5	2.461	0.215	2.413	2.470	3
2.010	1.920	-0.092	2.011	5	2.337	1.641	1.036	2.347	4	2.622	2.059	0.436	2.630	5
1.945	1.758	0.310	1.947	4	2.291	1.481	0.795	2.359	1	2.624	1.870	0.493	2.624	5
1.967	1.178	0.613	1.984	1	2.294	1.323	0.676	2.329	1	2.624	1.680	0.549	2.630	4
1.987	0.967	1.321	1.987	1	2.288	1.129	0.707	2.297	1	2.623	1.491	0.563	2.648	4
1.988	0.753	0.924	1.995	1	2.280	0.931	0.791	2.280	1	2.614	1.314	0.475	2.644	1
1.967	0.552	0.748	2.001	1	2.284	0.747	0.653	2.290	1	2.612	1.129	0.272	2.620	1
1.947	0.357	0.416	2.027	1	2.287	0.560	0.937	2.315	1	2.618	0.949	0.235	2.618	1
2.206	2.107	3.607	2.220	5	2.289	0.375	1.071	2.353	1	2.611	0.761	0.213	2.616	1
2.236	1.888	0.044	2.236	5	2.315	0.222	1.734	2.326	3	2.614	0.577	0.228	2.637	1
2.161	1.683	0.094	2.168	4	2.477	2.064	2.823	2.485	5	2.622	0.389	0.432	2.651	3
2.085	1.516	0.079	2.169	1	2.490	1.876	2.435	2.490	5	2.628	0.197	0.415	2.635	3
2.117	1.346	0.636	2.160	1	2.476	1.663	2.172	2.484	4					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.2

PRESSURE FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 4.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.101	1.192	0.200	2.119	1
2.145	0.964	0.539	2.146	1
2.143	0.750	0.256	2.150	1
2.101	0.536	0.337	2.136	1
2.057	0.331	0.185	2.140	1
2.345	2.117	2.009	2.360	5
2.392	1.888	-0.407	2.392	5
2.279	1.675	-0.274	2.286	4
2.172	1.519	-0.177	2.253	1
2.235	1.349	0.268	2.276	1
2.298	1.143	0.458	2.309	1
2.314	0.954	0.454	2.314	1
2.320	0.768	0.705	2.325	1
2.295	0.564	0.839	2.322	1
2.270	0.370	0.591	2.335	1
2.314	0.196	0.253	2.322	3
2.359	1.860	0.218	2.559	5
2.442	1.305	0.220	2.472	1
2.453	1.113	0.638	2.461	1
2.463	0.927	1.135	2.463	1
2.464	0.753	0.748	2.470	1
2.454	0.574	0.523	2.478	1
2.440	0.387	0.295	2.497	1
2.478	0.230	0.948	2.489	3

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.709	1.878	0.830	2.708	5
2.632	1.286	0.499	2.658	1
2.616	1.100	0.776	2.622	1
2.614	0.930	1.043	2.614	1
2.621	0.762	1.093	2.626	1
2.625	0.587	0.875	2.645	1
2.634	0.400	0.568	2.664	3
2.672	0.234	0.730	2.682	3
2.828	2.083	0.886	2.837	5
2.828	1.881	1.275	2.828	5
2.830	1.659	1.130	2.837	4
2.832	1.451	0.682	2.861	4
2.814	1.282	0.512	2.872	4
2.785	1.111	0.606	2.791	1
2.777	0.935	0.792	2.777	1
2.779	0.763	0.874	2.782	1
2.785	0.586	0.852	2.805	1
2.809	0.409	1.146	2.839	3
2.833	0.214	1.005	2.841	3
2.965	2.072	1.495	2.972	5
2.961	1.871	0.516	2.961	5
2.967	1.670	0.828	2.973	4
2.975	1.477	1.292	2.999	4
2.971	1.290	2.022	3.025	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.943	1.115	1.286	2.950	1
2.932	0.938	1.050	2.932	1
2.934	0.756	1.204	2.939	1
2.938	0.580	1.145	2.995	3
2.960	0.396	1.295	2.987	3
2.974	0.208	1.109	2.981	3
3.101	2.073	0.756	3.108	5
3.110	1.877	0.601	3.110	5
3.114	1.682	0.752	3.119	4
3.110	1.496	0.782	3.131	4
3.104	1.305	0.540	3.153	4
3.094	1.122	0.485	3.180	4
3.086	0.936	0.339	3.086	1
3.087	0.752	0.322	3.092	1
3.096	0.569	0.334	3.148	3
3.106	0.391	0.525	3.130	3
3.113	0.196	0.669	3.120	3
3.252	2.052	0.042	3.258	5
3.251	1.853	0.111	3.261	5
3.257	1.657	0.075	3.264	4
3.260	1.478	0.042	3.282	4
3.258	1.299	0.059	3.306	4
3.258	1.119	0.052	3.341	4

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 5.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.649	1.462	-0.036	2.649	5
2.539	1.328	0.056	2.572	1
2.559	1.125	0.058	2.567	1
2.579	0.926	0.274	2.579	1
2.581	0.736	0.094	2.588	1
2.560	0.545	0.107	2.583	1
2.534	0.354	0.124	2.559	3
2.575	0.205	0.833	2.583	3
2.424	1.880	0.205	2.825	5
2.742	1.295	0.218	2.799	4
2.743	1.101	0.472	2.749	1
2.757	0.925	0.577	2.757	1
2.762	0.750	0.694	2.767	1
2.753	0.571	0.488	2.775	1
2.754	0.382	0.188	2.780	3
2.798	0.228	0.422	2.808	3
2.973	2.096	0.355	2.983	5
2.970	1.874	0.628	2.970	5
2.979	1.653	0.179	2.986	4
2.981	1.436	[illegible]	3.011	4
2.961	1.274	-0.112	3.019	4
2.936	1.106	0.151	2.942	1
2.935	0.931	0.452	2.935	1
2.934	0.757	0.514	2.938	1
2.932	0.584	0.490	2.990	3
2.955	0.411	0.773	2.983	3
2.982	0.218	0.693	2.990	3
3.122	2.084	0.504	3.130	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.118	1.868	0.160	3.118	5
3.132	1.636	0.615	3.140	4
3.153	1.445	1.030	3.180	4
3.159	1.262	1.436	3.214	4
3.116	1.099	1.172	3.207	4
3.099	0.931	0.898	3.100	1
3.103	0.754	1.012	3.107	1
3.108	0.582	0.668	3.162	3
3.130	0.407	0.641	3.156	3
3.142	0.215	0.395	3.149	3
3.267	2.079	0.700	3.274	5
3.272	1.857	0.126	3.272	5
3.292	1.648	0.113	3.298	4
3.290	1.471	1.103	3.313	4
3.272	1.274	1.829	3.323	4
3.255	1.096	1.419	3.343	4
3.241	0.925	0.802	3.241	1
3.242	0.753	0.945	3.329	3
3.259	0.578	0.789	3.310	3
3.277	0.404	1.035	3.302	3
3.283	0.197	0.699	3.289	3
3.399	2.057	0.110	3.405	5
3.409	1.861	0.479	3.409	5
3.409	1.645	1.480	3.415	4
3.398	1.450	0.951	3.422	4
3.374	1.284	0.672	3.422	4
3.362	1.099	1.047	3.447	4
3.362	0.916	1.088	3.491	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.367	0.752	1.073	3.450	3
3.376	0.579	1.073	3.425	3
3.395	0.388	0.801	3.417	3
3.400	0.195	0.613	3.406	3
3.519	2.046	2.035	3.524	5
3.516	1.830	1.309	3.516	4
3.506	1.644	0.939	3.512	4
3.509	1.459	1.066	3.532	4
3.499	1.275	0.684	3.547	4
3.482	1.102	0.490	3.563	4
3.482	0.928	0.960	3.604	4
3.483	0.745	1.043	3.561	3
3.491	0.571	1.049	3.538	3
3.512	0.383	1.003	3.533	3
3.524	0.186	0.908	3.529	3
3.635	2.037	0.267	3.639	5
3.645	1.843	0.274	3.645	4
3.641	1.652	0.326	3.647	4
3.637	1.474	0.255	3.657	4
3.632	1.280	0.286	3.678	4
3.627	1.096	0.231	3.705	4
3.627	0.922	0.102	3.746	4
3.645	0.378	0.141	3.664	3
3.652	0.170	0.244	3.656	3
3.813	2.031	0.040	3.817	5
3.808	1.836	0.031	3.808	4

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.3

PRESSURE FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME = 6.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
2.898	1.896	0.168	2.898	5
2.914	1.318	-0.069	2.865	4
2.811	1.118	-0.012	2.818	1
2.826	0.926	-0.001	2.826	1
2.830	0.735	0.163	2.836	1
2.822	0.542	0.164	2.847	1
2.837	0.356	0.105	2.859	3
3.048	2.110	0.522	3.059	5
3.050	1.880	0.327	3.050	5
3.063	1.670	0.033	3.074	4
3.066	1.459	0.139	3.091	4
3.046	1.296	-0.133	3.098	4
3.031	1.123	-0.099	3.038	1
3.033	0.933	-0.009	3.033	1
3.025	0.739	0.102	3.031	1
3.020	0.557	0.167	3.071	3
3.053	0.386	0.673	3.078	3
3.047	0.202	0.613	3.094	3
3.207	2.096	0.171	3.216	5
3.208	1.880	0.010	3.208	5
3.232	1.640	0.565	3.239	4
3.247	1.451	0.639	3.272	4
3.262	1.276	0.703	3.313	4
3.235	1.111	0.608	3.320	4
3.220	0.933	0.289	3.220	1
3.218	0.743	0.447	3.303	3
3.218	0.565	0.311	3.267	3
3.244	0.393	0.334	3.268	3
3.255	0.206	0.306	3.262	3
3.371	2.092	0.299	3.379	5
3.378	1.861	-0.106	3.378	5
3.401	1.649	-0.166	3.408	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.409	1.469	0.604	3.432	4
3.406	1.279	0.786	3.454	4
3.397	1.103	0.832	3.479	4
3.384	0.927	0.346	3.510	4
3.381	0.746	0.326	3.462	3
3.394	0.572	0.390	3.442	3
3.409	0.398	0.581	3.432	3
3.410	0.192	0.405	3.415	3
3.523	2.067	-0.201	3.529	5
3.534	1.866	0.090	3.534	5
3.536	1.641	0.990	3.542	4
3.539	1.451	0.616	3.562	4
3.523	1.288	0.463	3.569	4
3.516	1.099	0.855	3.597	4
3.518	0.918	0.704	3.641	4
3.525	0.751	0.618	3.604	3
3.529	0.576	0.701	3.576	3
3.538	0.383	0.541	3.558	3
3.535	0.191	0.466	3.540	3
3.670	2.057	0.798	3.675	5
3.667	1.828	0.327	3.667	4
3.653	1.645	0.369	3.659	4
3.662	1.456	0.669	3.684	4
3.660	1.266	0.268	3.707	4
3.642	1.096	0.282	3.721	4
3.651	0.925	0.693	3.758	4
3.654	0.747	0.595	3.729	3
3.655	0.573	0.625	3.700	3
3.663	0.384	0.605	3.684	3
3.666	0.182	0.612	3.671	3
3.782	2.040	0.624	3.786	5
3.800	1.849	0.588	3.800	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.790	1.642	0.530	3.796	4
3.777	1.466	0.663	3.797	4
3.779	1.265	0.890	3.825	4
3.773	1.086	0.938	3.851	4
3.771	0.916	0.992	3.887	4
3.778	0.752	0.913	3.853	3
3.778	0.577	0.786	3.822	3
3.779	0.382	0.701	3.798	3
3.784	0.174	0.593	3.788	3
3.908	2.041	0.888	3.913	5
3.911	1.841	1.040	3.911	4
3.901	1.636	0.973	3.907	4
3.894	1.449	1.195	3.915	4
3.895	1.265	0.857	3.940	4
3.894	1.085	0.812	3.970	4
3.896	0.910	0.887	4.009	4
3.902	0.741	0.963	3.971	3
3.901	0.557	0.815	3.940	3
3.897	0.361	0.688	3.914	3
3.916	0.150	0.769	3.919	3
4.034	2.041	0.698	4.038	5
4.029	1.834	0.687	4.029	4
4.023	1.642	0.519	4.029	4
4.027	1.460	0.433	4.046	4
4.033	1.283	0.480	4.074	4
4.033	1.093	0.562	4.105	4
4.030	0.917	0.468	4.138	4
4.033	0.745	0.511	4.101	3
4.038	0.552	0.475	4.076	3
4.038	0.349	0.382	4.053	3
4.054	0.165	0.278	4.058	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES = 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.4

PRESSURE FIELD   DIPOLE WEST/8   WES/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME=   7.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.093	2.137	0.499	3.106	5	3.625	0.744	0.264	3.700	3	4.158	1.459	0.537	4.177	4
3.105	1.916	0.547	3.106	5	3.633	0.564	0.383	3.677	3	4.169	1.274	1.154	4.210	4
3.119	1.697	0.071	3.123	4	3.641	0.368	0.406	3.659	3	4.180	1.084	1.009	4.251	4
3.117	1.486	0.099	3.139	4	3.640	0.179	0.469	3.645	3	4.179	0.909	0.776	4.236	4
3.089	1.313	-0.137	3.135	4	3.760	2.067	0.775	3.765	5	4.181	0.739	0.600	4.245	3
3.065	1.131	-0.142	3.150	4	3.760	1.842	0.341	3.760	4	4.175	0.545	0.431	4.211	3
3.070	0.939	-0.218	3.070	1	3.752	1.660	0.205	3.757	4	4.165	0.342	0.519	4.179	3
3.066	0.745	-0.028	3.071	1	3.769	1.466	0.516	3.789	4	4.168	0.154	0.172	4.170	3
3.059	0.564	0.054	3.121	3	3.772	1.274	0.121	3.817	4	4.236	2.058	1.022	4.291	5
3.124	0.392	0.536	3.148	3	3.761	1.099	0.013	3.836	4	4.290	1.846	1.311	4.290	4
3.175	0.206	0.420	3.182	3	3.769	0.927	0.166	3.882	4	4.291	1.647	1.343	4.295	4
3.266	2.114	0.133	3.276	5	3.772	0.741	0.141	3.844	3	4.292	1.467	1.020	4.309	4
3.265	1.898	-0.176	3.266	5	3.772	0.558	0.317	3.813	3	4.285	1.287	0.769	4.322	4
3.292	1.659	0.334	3.298	4	3.777	0.367	0.310	3.795	3	4.297	1.104	0.907	4.363	4
3.313	1.469	0.207	3.336	4	3.777	0.173	0.480	3.781	3	4.307	0.924	1.120	4.407	4
3.321	1.291	0.078	3.369	4	3.885	2.046	0.211	3.890	5	4.307	0.752	1.034	4.372	3
3.291	1.122	0.186	3.372	4	3.908	1.856	0.205	3.908	5	4.299	0.554	1.020	4.335	3
3.279	0.934	-0.028	3.279	1	3.901	1.653	0.130	3.906	4	4.298	0.356	0.976	4.313	3
3.280	0.736	0.190	3.362	3	3.898	1.473	0.207	3.916	4	4.298	0.171	0.779	4.301	3
3.288	0.559	0.057	3.335	3	3.908	1.272	0.272	3.951	4	4.417	2.048	0.441	4.421	5
3.327	0.385	0.170	3.349	3	3.911	1.091	0.464	3.985	4	4.408	1.842	0.286	4.408	4
3.346	0.199	0.377	3.352	3	3.912	0.915	0.564	4.024	4	4.419	1.652	0.268	4.423	4
3.441	2.112	0.192	3.450	5	3.920	0.746	0.216	3.990	3	4.419	1.469	0.351	4.436	4
3.452	1.877	-0.244	3.452	5	3.912	0.564	0.286	3.953	3	4.419	1.286	0.418	4.456	4
3.481	1.668	-0.328	3.436	4	3.906	0.364	0.466	3.923	3	4.425	1.104	0.473	4.488	4
3.501	1.485	0.391	3.521	4	3.907	0.161	0.329	3.911	3	4.428	0.921	0.522	4.526	4
3.498	1.291	0.416	3.544	4	4.035	2.043	0.432	4.040	5	4.427	0.736	0.475	4.488	3
3.481	1.111	0.437	3.560	4	4.037	1.842	0.612	4.037	4	4.424	0.555	0.497	4.459	3
3.463	0.927	0.020	3.585	4	4.024	1.636	0.964	4.030	4	4.423	0.365	0.581	4.438	3
3.464	0.739	0.052	3.542	3	4.030	1.447	1.010	4.051	4	4.431	0.169	0.469	4.434	3
3.486	0.561	0.124	3.531	3	4.044	1.267	0.595	4.087	4	4.579	2.039	0.066	4.582	5
3.503	0.380	0.258	3.523	3	4.047	1.083	0.444	4.121	4	4.580	1.846	0.072	4.580	4
3.509	0.184	0.435	3.514	3	4.052	0.909	0.563	4.162	4	4.580	1.646	0.103	4.585	4
3.604	2.081	-0.283	3.611	5	4.055	0.737	0.933	4.122	3	4.577	1.459	0.117	4.595	4
3.622	1.883	-0.065	3.622	5	4.040	0.545	0.723	4.077	3	4.577	1.277	0.113	4.613	4
3.630	1.655	0.849	3.635	4	4.030	0.348	0.571	4.045	3	4.575	1.096	0.118	4.638	4
3.639	1.467	0.357	3.660	4	4.034	0.150	1.314	4.036	3	4.581	0.907	0.114	4.678	4
3.627	1.296	0.215	3.670	4	4.167	2.035	0.718	4.171	5	4.579	0.727	0.111	4.636	3
3.617	1.105	0.461	3.694	4	4.167	1.830	0.342	4.167	4	4.582	0.543	0.076	4.614	3
3.614	0.919	0.292	3.733	4	4.155	1.634	0.241	4.161	4	4.592	0.172	0.018	4.596	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
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OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
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PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.5

PRESSURE FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 8.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.325	2.133	0.044	3.337	5	3.870	0.169	0.338	3.874	3	4.431	1.107	0.405	4.494	4
3.360	1.474	0.117	3.381	4	3.954	2.062	0.100	3.960	5	4.441	0.921	0.563	4.538	4
3.368	1.293	0.034	3.415	4	3.981	1.872	0.105	3.981	5	4.440	0.739	0.360	4.501	3
3.325	1.125	0.181	3.404	4	3.978	1.671	-0.039	3.983	4	4.429	0.539	0.430	4.462	3
3.310	0.943	-0.019	3.310	1	3.978	1.484	-0.036	3.996	4	4.426	0.345	0.553	4.439	3
3.318	0.751	0.169	3.402	3	3.993	1.279	0.045	4.034	4	4.426	0.161	0.508	4.429	3
3.334	0.578	0.001	3.383	3	3.995	1.088	0.153	4.068	4	4.535	2.046	0.504	4.539	5
3.346	0.407	0.044	3.411	3	3.995	0.911	0.252	4.106	4	4.530	1.844	0.137	4.530	4
3.419	0.212	0.105	3.426	3	4.007	0.741	-0.034	4.075	3	4.539	1.649	0.360	4.543	4
3.498	2.132	0.312	3.509	5	4.002	0.557	0.121	4.041	3	4.542	1.465	0.577	4.559	4
3.554	1.496	0.193	3.572	4	4.002	0.358	0.268	4.018	3	4.548	1.287	0.779	4.584	4
3.545	1.296	0.243	3.589	4	4.006	0.156	0.121	4.009	3	4.560	1.094	0.695	4.623	4
3.521	1.113	0.309	3.599	4	4.115	2.052	0.238	4.120	5	4.567	0.908	0.698	4.665	4
3.493	0.932	-0.056	3.620	4	4.120	1.855	0.422	4.120	5	4.570	0.725	0.375	4.627	3
3.508	0.746	-0.004	3.537	3	4.113	1.651	0.737	4.118	4	4.565	0.536	0.514	4.596	3
3.544	0.571	0.062	3.590	3	4.123	1.458	0.652	4.142	4	4.558	0.348	0.752	4.571	3
3.574	0.393	0.169	3.595	3	4.141	1.272	0.301	4.182	4	4.560	0.158	0.623	4.563	3
3.587	0.191	0.259	3.592	3	4.146	1.084	0.192	4.217	4	4.672	2.035	0.571	4.675	5
3.664	2.101	-0.329	3.672	5	4.155	0.906	0.246	4.262	4	4.673	1.835	0.641	4.674	4
3.688	1.906	-0.131	3.688	5	4.156	0.728	0.618	4.220	3	4.670	1.635	0.596	4.676	4
3.695	1.672	0.694	3.699	4	4.142	0.535	0.485	4.176	3	4.671	1.448	0.721	4.689	4
3.699	1.479	0.166	3.719	4	4.135	0.341	0.457	4.149	3	4.674	1.272	0.569	4.710	4
3.682	1.302	0.038	3.724	4	4.143	0.145	1.108	4.145	3	4.675	1.087	0.561	4.738	4
3.666	1.107	0.226	3.742	4	4.257	2.041	0.541	4.261	5	4.690	0.901	0.914	4.787	4
3.661	0.917	0.140	3.779	4	4.264	1.838	0.139	4.264	4	4.694	0.713	0.629	4.747	3
3.680	0.744	0.141	3.755	3	4.257	1.645	0.003	4.262	4	4.690	0.525	0.690	4.719	3
3.701	0.569	0.240	3.744	3	4.264	1.470	0.244	4.281	4	4.686	0.345	0.748	4.698	3
3.710	0.373	0.245	3.738	3	4.279	1.278	0.769	4.318	4	4.686	0.162	0.662	4.689	3
3.724	0.180	0.238	3.729	3	4.295	1.087	0.655	4.363	4	4.810	2.035	0.692	4.813	5
3.824	2.084	0.909	3.830	5	4.295	0.907	0.298	4.399	4	4.806	1.842	0.716	4.806	4
3.828	1.861	0.300	3.828	5	4.295	0.727	0.310	4.356	3	4.806	1.641	0.724	4.811	4
3.820	1.678	0.065	3.825	4	4.286	0.534	0.275	4.319	3	4.809	1.457	0.844	4.825	4
3.837	1.477	0.271	3.856	4	4.278	0.331	0.370	4.291	3	4.805	1.274	0.919	4.841	4
3.841	1.278	-0.120	3.985	4	4.285	0.147	0.051	4.297	3	4.811	1.091	0.962	4.872	4
3.827	1.098	-0.222	3.902	4	4.390	2.061	0.672	4.395	5	4.812	0.919	0.952	4.902	4
3.830	0.922	-0.025	3.943	4	4.404	1.855	0.767	4.404	5	4.814	0.719	0.917	4.868	3
3.843	0.738	-0.014	3.913	3	4.411	1.651	0.989	4.415	4	4.817	0.528	1.122	4.845	3
3.852	0.557	0.188	3.892	3	4.414	1.471	0.627	4.431	4	4.819	0.346	0.852	4.832	3
3.863	0.365	0.155	3.880	3	4.411	1.289	0.280	4.448	4	4.818	0.166	0.795	4.821	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.6

PRESSURE FIELD DIPOLE WEST/8 WF5/295 SMOKE PUFF GRID 1220 /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 9.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.538	2.147	0.249	3.550	5
3.571	1.493	0.161	3.590	4
3.567	1.298	0.161	3.611	4
3.548	1.121	0.437	3.623	4
3.529	0.950	0.028	3.644	4
3.541	0.769	-0.043	3.623	3
3.584	0.597	-0.017	3.633	3
3.616	0.416	-0.061	3.639	3
3.629	0.199	0.003	3.634	3
3.699	2.118	-0.346	3.708	5
3.722	1.918	-0.068	3.723	5
3.726	1.675	0.277	3.730	4
3.727	1.483	0.024	3.746	4
3.712	1.304	-0.043	3.753	4
3.697	1.112	0.150	3.772	4
3.693	0.931	0.132	3.807	4
3.718	0.763	0.148	3.795	3
3.749	0.592	0.164	3.796	3
3.773	0.391	0.089	3.793	3
3.777	0.192	0.011	3.782	3
3.864	2.097	0.485	3.871	5
3.871	1.878	0.021	3.871	5
3.863	1.689	-0.077	3.867	4
3.876	1.482	0.102	3.894	4
3.832	1.280	-0.238	3.925	4
3.867	1.101	-0.270	3.940	4
3.867	0.927	0.030	3.977	4
3.887	0.753	-0.038	3.959	3
3.906	0.574	0.108	3.948	3
3.923	0.381	0.045	3.941	3
3.936	0.176	0.102	3.940	3
4.005	2.082	0.057	4.011	5
4.035	1.890	0.043	4.035	5
4.030	1.683	-0.134	4.033	4
4.027	1.491	-0.173	4.043	4
4.041	1.284	-0.005	4.082	4
4.038	1.086	0.103	4.111	4
4.041	0.914	0.159	4.150	4
4.059	0.752	-0.076	4.128	3
4.061	0.571	0.075	4.101	3
4.069	0.370	0.111	4.086	3
4.090	0.163	-0.039	4.083	3
4.173	2.074	0.101	4.178	5
4.179	1.876	0.264	4.179	5

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIC	R-SCAL METERS	REGN CODE
4.171	1.667	0.448	4.175	4
4.181	1.468	0.404	4.199	4
4.197	1.274	0.098	4.238	4
4.193	1.086	0.026	4.269	4
4.213	0.908	0.123	4.319	4
4.219	0.732	0.488	4.282	3
4.209	0.545	0.323	4.244	3
4.209	0.351	0.333	4.224	3
4.224	0.151	0.805	4.227	3
4.320	2.062	0.497	4.325	5
4.332	1.858	0.025	4.332	5
4.326	1.661	-0.146	4.330	4
4.332	1.480	0.040	4.348	4
4.345	1.283	0.497	4.383	4
4.361	1.088	0.454	4.429	4
4.367	0.908	0.059	4.469	4
4.369	0.729	0.151	4.429	3
4.363	0.536	0.151	4.396	3
4.363	0.336	0.206	4.376	3
4.375	0.149	-0.076	4.378	3
4.460	2.078	0.524	4.465	5
4.479	1.873	0.541	4.479	5
4.488	1.665	0.789	4.493	4
4.494	1.482	0.401	4.509	4
4.490	1.294	0.042	4.525	4
4.510	1.109	0.209	4.572	4
4.523	0.920	0.408	4.619	4
4.524	0.735	0.205	4.584	3
4.517	0.536	0.277	4.548	3
4.520	0.345	0.373	4.533	3
4.522	0.159	0.382	4.525	3
4.614	2.060	0.415	4.618	5
4.614	1.858	-0.001	4.614	5
4.627	1.663	0.136	4.631	4
4.635	1.477	0.236	4.650	4
4.642	1.292	0.356	4.677	4
4.653	1.095	0.298	4.715	4
4.663	0.906	0.303	4.759	4
4.668	0.720	0.064	4.723	3
4.665	0.531	0.315	4.695	3
4.661	0.344	0.551	4.674	3
4.666	0.155	0.371	4.668	3
4.759	2.047	0.480	4.763	5
4.766	1.848	0.511	4.765	4

X-SCAL METERS	Y-SCAL METLRS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
4.770	1.647	0.430	4.775	4
4.776	1.457	0.474	4.793	4
4.782	1.277	0.284	4.817	4
4.784	1.088	0.327	4.845	4
4.800	0.898	0.573	4.895	4
4.804	0.705	0.464	4.855	3
4.801	0.517	0.522	4.828	3
4.797	0.338	0.551	4.809	3
4.803	0.157	0.514	4.805	3
4.913	2.033	0.380	4.917	5
4.916	1.852	0.265	4.916	5
4.913	1.646	0.485	4.918	4
4.930	1.460	0.469	4.946	4
4.934	1.278	0.350	4.968	4
4.933	1.092	0.622	4.992	4
4.935	0.912	0.460	5.025	4
4.940	0.710	0.451	4.990	3
4.936	0.517	0.797	4.963	3
4.938	0.335	0.732	4.950	3
4.938	0.159	0.817	4.940	3
5.056	2.027	0.579	5.059	5
5.063	1.836	0.491	5.063	4
5.052	1.647	0.512	5.056	4
5.062	1.460	0.758	5.078	4
5.076	1.269	0.565	5.110	4
5.075	1.089	0.580	5.132	4
5.090	0.911	0.485	5.167	4
5.077	0.727	0.417	5.129	3
5.082	0.531	0.364	5.109	3
5.072	0.332	0.522	5.063	3
5.070	0.142	0.518	5.072	3
5.185	2.039	0.404	5.188	5
5.193	1.836	0.393	5.193	4
5.188	1.644	0.360	5.192	4
5.198	1.468	0.395	5.213	4
5.206	1.277	0.294	5.239	4
5.213	1.088	0.470	5.270	4
5.212	0.918	0.362	5.295	4
5.220	0.737	0.362	5.271	3
5.214	0.541	0.410	5.242	3
5.201	0.332	0.409	5.212	3
5.202	0.141	0.444	5.203	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.7

PRESSURE FIFLD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 10.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
3.711	2.130	-0.333	3.721	5	4.254	0.564	0.191	4.292	3	4.854	1.092	0.182	4.914	4
3.725	1.911	-0.042	3.725	5	4.259	0.365	0.185	4.274	3	4.873	0.902	0.371	4.966	4
3.733	1.677	-0.045	3.737	4	4.277	0.160	0.630	4.280	3	4.881	0.710	0.365	4.932	3
3.744	1.488	-0.053	3.762	4	4.367	2.080	0.388	4.373	5	4.881	0.523	0.343	4.909	3
3.738	1.312	-0.057	3.778	4	4.375	1.871	-0.104	4.375	5	4.882	0.343	0.385	4.894	3
3.732	1.129	0.125	3.802	4	4.366	1.669	-0.256	4.370	4	4.890	0.161	0.284	4.893	3
3.724	0.960	0.094	3.830	4	4.371	1.485	-0.073	4.387	4	4.987	2.057	0.246	4.991	5
3.748	0.790	0.122	3.831	3	4.384	1.290	0.388	4.421	4	4.991	1.870	0.117	4.991	5
3.778	0.513	-0.022	3.828	3	4.402	1.094	0.429	4.467	4	4.988	1.660	0.310	4.992	4
3.793	0.406	-0.082	3.815	3	4.413	0.920	-0.002	4.512	4	5.007	1.470	0.297	5.021	4
3.793	0.203	-0.084	3.799	3	4.419	0.744	0.093	4.481	3	5.010	1.284	0.240	5.043	4
3.879	2.102	0.020	3.887	5	4.416	0.551	0.048	4.450	3	5.010	1.092	0.454	5.068	4
3.888	1.887	-0.189	3.888	5	4.419	0.349	0.098	4.432	3	5.012	0.910	0.424	5.101	4
3.886	1.693	-0.139	3.890	4	4.434	0.157	-0.190	4.437	3	5.024	0.710	0.408	5.074	3
3.898	1.487	0.129	3.916	4	4.512	2.097	0.374	4.519	5	5.024	0.520	0.621	5.051	3
3.909	1.289	-0.173	3.950	4	4.530	1.890	0.382	4.530	5	5.031	0.338	0.599	5.042	3
3.902	1.118	-0.162	3.972	4	4.536	1.676	0.696	4.539	4	5.035	0.161	0.590	5.038	3
3.902	0.951	0.110	4.005	4	4.540	1.490	0.329	4.555	4	5.140	2.046	0.340	5.144	5
3.919	0.783	-0.108	3.997	3	4.535	1.298	-0.069	4.569	4	5.149	1.851	0.234	5.149	4
3.941	0.597	-0.011	3.986	3	4.558	1.115	0.124	4.618	4	5.138	1.660	0.275	5.141	4
3.956	0.398	-0.073	3.975	3	4.578	0.928	0.301	4.671	4	5.151	1.469	0.369	5.166	4
3.964	0.187	-0.113	3.968	3	4.582	0.745	0.105	4.643	3	5.166	1.274	0.183	5.199	4
4.038	2.096	-0.060	4.045	5	4.578	0.547	0.121	4.611	3	5.163	1.088	0.160	5.220	4
4.068	1.899	-0.034	4.068	5	4.586	0.355	0.193	4.600	3	5.171	0.908	0.189	5.257	4
4.058	1.687	-0.214	4.062	4	4.589	0.167	0.180	4.592	3	5.171	0.725	0.150	5.221	3
4.056	1.494	-0.275	4.072	4	4.672	2.079	0.309	4.678	5	5.182	0.529	0.154	5.209	3
4.072	1.294	-0.089	4.111	4	4.673	1.873	-0.131	4.673	5	5.175	0.334	0.333	5.186	3
4.070	1.102	0.135	4.139	4	4.683	1.674	-0.047	4.687	4	5.175	0.141	0.301	5.177	3
4.078	0.936	0.191	4.181	4	4.691	1.486	0.021	4.706	4	5.275	2.051	0.380	5.278	5
4.099	0.778	-0.133	4.171	3	4.700	1.296	0.108	4.733	4	5.287	1.846	0.307	5.287	4
4.101	0.593	-0.039	4.143	3	4.712	1.101	0.149	4.773	4	5.294	1.654	0.221	5.288	4
4.111	0.384	-0.040	4.129	3	4.726	0.913	0.203	4.819	4	5.305	1.474	0.113	5.319	4
4.124	0.175	-0.148	4.127	3	4.736	0.728	-0.055	4.791	3	5.322	1.283	-0.077	5.353	4
4.214	2.090	0.000	4.220	5	4.737	0.540	0.186	4.767	3	5.327	1.092	0.102	5.381	4
4.215	1.887	0.114	4.215	5	4.737	0.351	0.422	4.750	3	5.321	0.916	0.104	5.404	4
4.204	1.672	0.392	4.208	4	4.743	0.160	0.188	4.746	3	5.332	0.733	0.073	5.382	3
4.217	1.473	0.478	4.234	4	4.824	2.067	0.347	4.829	5	5.327	0.536	0.252	5.354	3
4.235	1.279	0.134	4.274	4	4.833	1.864	0.350	4.833	5	5.314	0.324	0.208	5.324	3
4.234	1.097	0.008	4.301	4	4.837	1.660	0.260	4.841	4	5.318	0.136	0.279	5.319	3
4.253	0.925	0.154	4.353	4	4.844	1.466	0.283	4.860	4					
4.264	0.753	0.434	4.330	3	4.852	1.283	0.139	4.886	4					

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.8

PRESSURE FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A730106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 11.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
4.100	1.121	0.050	4.166	4
4.109	0.952	0.097	4.207	4
4.125	0.391	-0.150	4.144	3
4.223	1.673	0.385	4.227	4
4.266	1.117	0.033	4.330	4
4.288	0.946	0.121	4.383	4
4.282	0.372	0.077	4.298	3
4.394	2.085	0.271	4.399	5
4.399	1.873	-0.164	4.399	5
4.390	1.673	-0.266	4.394	4
4.398	1.493	-0.067	4.413	4
4.413	1.303	0.367	4.448	4
4.435	1.113	0.428	4.497	4
4.450	0.941	-0.038	4.543	4
4.453	0.764	0.057	4.518	3
4.447	0.566	-0.033	4.483	3
4.447	0.360	0.045	4.462	3
4.465	0.163	-0.264	4.458	3
4.545	2.108	0.197	4.552	5
4.560	1.896	0.257	4.560	5
4.564	1.682	0.610	4.568	4
4.570	1.498	0.331	4.584	4
4.566	1.310	-0.054	4.599	4
4.593	1.130	0.155	4.650	4
4.619	0.946	0.213	4.708	4
4.623	0.763	0.022	4.685	3
4.617	0.564	-0.021	4.651	3

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
4.625	0.367	0.031	4.639	3
4.627	0.177	0.010	4.631	3
4.712	2.093	0.180	4.718	5
4.710	1.883	-0.211	4.710	5
4.717	1.681	-0.101	4.720	4
4.725	1.494	-0.031	4.738	4
4.733	1.305	0.035	4.766	4
4.783	0.743	-0.113	4.840	3
4.784	0.553	0.064	4.816	3
4.784	0.361	0.354	4.797	3
4.790	0.169	0.066	4.793	3
4.870	2.082	0.228	4.875	5
4.877	1.874	0.208	4.877	5
4.878	1.668	0.146	4.882	4
4.883	1.472	0.202	4.898	4
4.893	1.291	0.080	4.925	4
4.935	0.723	0.190	4.988	3
4.936	0.532	0.145	4.965	3
4.938	0.353	0.243	4.951	3
4.946	0.167	0.090	4.948	3
5.040	2.073	0.118	5.045	5
5.042	1.884	0.008	5.042	5
5.036	1.667	0.178	5.040	4
5.054	1.475	0.184	5.068	4
5.060	1.290	0.124	5.091	4
5.062	1.100	0.363	5.118	4
5.070	0.919	0.312	5.156	4

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
5.086	0.719	0.315	5.137	3
5.091	0.530	0.488	5.118	3
5.099	0.348	0.397	5.111	3
5.103	0.169	0.305	5.106	3
5.200	2.065	0.205	5.205	5
5.206	1.864	0.109	5.206	5
5.192	1.670	0.120	5.195	4
5.207	1.474	0.220	5.221	4
5.225	1.278	0.064	5.257	4
5.224	1.093	0.093	5.280	4
5.235	0.915	0.107	5.319	4
5.241	0.734	0.087	5.292	3
5.256	0.539	0.043	5.284	3
5.251	0.343	0.249	5.263	3
5.252	0.144	0.149	5.254	3
5.340	2.069	0.276	5.344	5
5.353	1.860	0.119	5.353	5
5.351	1.667	0.020	5.355	4
5.375	1.481	-0.093	5.388	4
5.395	1.288	-0.237	5.425	4
5.400	1.096	-0.044	5.453	4
5.395	0.921	-0.038	5.476	4
5.411	0.740	-0.026	5.461	3
5.407	0.542	0.151	5.435	3
5.396	0.327	0.047	5.406	3
5.405	0.139	0.114	5.407	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
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OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

TABLE 9.9

PRESSURE FIELD   DIPOLE WEST/8   WF5/295   SMOKE PUFF GRID 1220   /A780106

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 12.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
4.557	2.113	0.110	4.554	5	4.901	1.881	0.175	4.901	5	5.226	1.678	0.066	5.229	4
4.576	1.903	0.269	4.577	5	4.904	1.678	0.156	4.907	4	5.245	1.485	0.185	5.259	4
4.586	1.694	0.574	4.588	4	4.911	1.485	0.214	4.925	4	5.269	1.290	-0.011	5.299	4
4.594	1.514	0.281	4.606	4	4.922	1.306	0.070	4.953	4	5.272	1.108	0.056	5.325	4
4.599	1.330	-0.047	4.619	4	4.972	0.736	0.099	5.026	3	5.285	0.931	-0.031	5.365	4
4.619	1.149	0.153	4.673	4	4.969	0.533	0.042	4.998	3	5.293	0.748	-0.031	5.345	3
4.648	0.963	0.150	4.733	4	4.970	0.360	0.120	4.983	3	5.310	0.551	-0.062	5.339	3
4.646	0.775	-0.026	4.711	3	4.977	0.173	-0.026	4.980	3	5.304	0.351	0.122	5.316	3
4.634	0.573	-0.078	4.669	3	5.074	2.083	-0.005	5.079	5	5.301	0.150	0.056	5.303	3
4.639	0.373	-0.042	4.654	3	5.073	1.892	-0.066	5.073	5	5.384	2.082	0.210	5.389	5
4.642	0.181	-0.012	4.645	3	5.066	1.675	0.134	5.069	4	5.395	1.869	0.031	5.395	5
4.732	2.099	0.044	4.738	5	5.086	1.487	0.142	5.100	4	5.392	1.675	-0.049	5.395	4
4.729	1.890	-0.223	4.730	5	5.095	1.304	0.050	5.125	4	5.418	1.489	-0.123	5.431	4
4.741	1.692	-0.079	4.744	4	5.100	1.117	0.288	5.154	4	5.441	1.298	-0.243	5.470	4
4.751	1.509	-0.034	4.764	4	5.110	0.936	0.186	5.193	4	5.450	1.107	0.029	5.502	4
4.759	1.320	-0.009	4.789	4	5.128	0.732	0.161	5.180	3	5.451	0.934	-0.064	5.528	4
4.813	0.755	-0.221	4.872	3	5.135	0.541	0.311	5.163	3	5.468	0.752	-0.031	5.519	3
4.810	0.563	-0.089	4.843	3	5.142	0.357	0.209	5.154	3	5.466	0.552	0.117	5.494	3
4.803	0.367	0.250	4.817	3	5.144	0.174	0.156	5.147	3	5.454	0.333	-0.045	5.464	3
4.811	0.174	-0.052	4.814	3	5.241	2.077	0.119	5.246	5	5.462	0.143	0.036	5.464	3
4.897	2.090	0.135	4.902	5	5.244	1.873	0.034	5.244	5					

AVERAGE HYDROSTATIC OVERPRESSURES AT SCALED TIME= 13.000 MS

X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE	X-SCAL METERS	Y-SCAL METERS	PRESSURE RATIO	R-SCAL METERS	REGN CODE
4.740	2.110	0.022	4.747	5	4.992	0.177	-0.073	4.995	3	5.302	1.125	-0.080	5.352	4
4.742	1.905	-0.210	4.742	5	5.091	2.090	-0.041	5.096	5	5.314	0.945	-0.169	5.392	4
4.760	1.712	-0.176	4.762	4	5.091	1.903	-0.049	5.092	5	5.319	0.758	-0.167	5.373	3
4.772	1.529	-0.135	4.784	4	5.089	1.693	0.162	5.092	4	5.339	0.558	-0.108	5.368	3
4.781	1.336	-0.089	4.809	4	5.111	1.507	0.164	5.123	4	5.331	0.355	0.004	5.343	3
4.831	0.759	-0.300	4.890	3	5.119	1.324	0.103	5.147	4	5.328	0.154	-0.028	5.330	3
4.823	0.565	-0.151	4.856	3	5.128	1.134	0.278	5.178	4	5.414	2.092	0.091	5.419	5
4.811	0.371	0.127	4.825	3	5.135	0.949	0.205	5.214	4	5.426	1.878	-0.028	5.426	5
4.819	0.176	-0.139	4.822	3	5.150	0.739	0.148	5.203	3	5.423	1.688	-0.057	5.426	4
4.909	2.098	0.100	4.915	5	5.156	0.546	0.218	5.185	3	5.453	1.506	-0.158	5.464	4
4.919	1.895	0.216	4.919	5	5.162	0.362	0.120	5.174	3	5.478	1.317	-0.286	5.504	4
4.928	1.696	0.181	4.931	4	5.164	0.177	0.114	5.167	3	5.490	1.125	-0.065	5.538	4
4.937	1.504	0.182	4.950	4	5.254	2.085	0.029	5.269	5	5.490	0.945	-0.139	5.565	4
4.948	1.323	0.023	4.977	4	5.268	1.883	-0.000	5.268	5	5.505	0.761	-0.132	5.558	3
4.994	0.743	0.070	5.049	3	5.253	1.694	0.070	5.255	4	5.503	0.559	-0.007	5.531	3
4.987	0.544	0.021	5.017	3	5.272	1.503	0.102	5.284	4	5.491	0.339	-0.173	5.502	3
4.985	0.364	0.070	4.998	3	5.295	1.310	-0.093	5.324	4	5.500	0.144	-0.121	5.502	3

X AND Y LOCATE THE CENTER OF A PLANE QUADRILATERAL WHICH IS A CELL OF 4 NEIGHBOURING SMOKE PUFFS.
OVERPRESSURE IS AVERAGED OVER THE AREA OF THE CELL AND IS EXPRESSED AS A RATIO TO THE AMBIENT PRESSURE.

OBSERVED DISTANCE VALUES= 8.1051 TIMES SCALED VALUES
AND OBSERVED TIME VALUE = 8.0262 TIMES SCALED VALUE.
PRESSURE VALUES AS SHOWN ARE INVARIANT UNDER SCALING.

PHOTOGRAMMETRY OF THE PARTICLE TRAJECTORIES ON DIPOLE WEST SHOTS 8 TO 11

ADDENDUM TO VOLUMES 1 AND 2

Hydrostatic and Total Pressures Compared with Gauge Measurements on Shots 9 and 10

by

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Contract No. CGE/PO 9509-50416

Introduction

Volumes 1 and 2 of this report presented the results of the particle trajectory photogrammetry of Dipole West Shots 10 and 9, respectively. Those results included the variation with distance of the strengths of the primary spherical shocks from the pairs of charges and of the Mach shocks over the ground and at the interaction plane between the pairs of charges; the particle velocity, density, hydrostatic overpressure and dynamic pressure fields throughout the blast waves at various times, and the time histories of these physical properties at several fixed positions. In particular, the time histories were given for positions which coincided with electronic gauge locations. At the time those reports were prepared the results of the gauge measurements were not available to the authors, and a direct comparison between the histories obtained from the particle trajectory analysis and those measured with electronic transducers was not possible. The gauge measurements have now been made available (Keefer & Reisler, 1975) and a comparison between the results obtained by the two measurement techniques for Shots 9 and 10 is the subject of this addendum. Similar comparisons for Shots 8 and 11 will be included in subsequent volumes of this report.

Two types of electronic pressure transducer were used in these experiments, arranged with the sensitive elements either side-on or face-on to the blast, to measure the hydrostatic and total overpressures respectively. The calibrated signals from these transducers are presented by Keefer & Reisler (1975), together with the time history of the integral of each signal, representing the hydrostatic and total overpressure impulses.

To facilitate the comparisons described above, the pressure-time histories at the gauge locations calculated from the particle trajectory analyses are plotted on identical scales to those used to report the gauge results. Computed hydrostatic overpressures are plotted; also total pressures obtained by adding to the hydrostatic overpressures the computed dynamic pressures, with the application of a compressibility correction. Both types of result were also integrated to give the side-on and face-on pressure impulses.

Comparisons were made for all gauge locations which lay within the smoke puff grids. The gauges were mounted on a vertical gun barrel at a distance of 60 ft (18.3 m) from GZ and at heights above the ground of 10, 15, 20, 27, 30, 33 and 40 ft. (The interaction plane between the two charges in Shots 9 and 10 was at a height of 30 ft.)

Calculation of Total Pressure

Dynamic pressures ($\frac{1}{2}\rho u^2$, where ρ is the density and u is the particle velocity) and hydrostatic overpressures obtained from the analysis of the particle trajectories were used to compute total pressures after the application of a compressibility correction. The amount of the correction was computed as a function of local Mach number, the form of the function depending on whether the Mach number was greater than or less than unity. (If the local Mach number is greater than one, a bow shock forms around a pressure gauge and this further modifies the flow.)

Two assumptions were made: the first was that the ratio of specific heats of air remains constant at 1.4. In other words, it was assumed that there were no real gas effects of importance. At positions on the 60ft gun barrel where the comparisons with the gauge results are made, the maximum total pressure computed was always less than 6 atmospheres.

The second assumption was that the reflected pressure would not be detected because of the small size of the gauges used. The reflected pressure at a surface face-on to a blast wave lasts only until the pressure is relieved by the rarefraction wave produced as the shock defracts around the edge of the face-on surface. In the case of a small pressure transducer this relief of reflected pressure will be complete in a few tenths of a millisecond.

For each point at which the total pressure was to be calculated the square of the local Mach number, M, was computed using

$$M^2 = 2\,\frac{q}{\gamma S}\ ,$$

where q is the dynamic pressure, S the absolute hydrostatic pressure and γ the ratio of specific heats. The values of q and S obtained from the particle trajectory analysis are both ratios of the ambient atmospheric pressure. In the cases where M^2 was less than 1, the total pressure, T, was calculated using

$$T = S\left[\frac{(\gamma-1)M^2}{2} + 1\right]^{\frac{\gamma}{\gamma-1}} .$$

In the cases where M^2 was greater than 1, the total-head pressure was calculated from

$$T = \frac{S\left[\left(\frac{\gamma+1}{2}\right)^{\frac{\gamma}{\gamma-1}} M^2\right]}{\left[\frac{2\gamma}{\gamma+1} - \left(\frac{\gamma-1}{\gamma+1}\right)\Big/M^2\right]^{\frac{1}{\gamma-1}}} .$$

It should be noted that the values obtained from the above equations are measures of absolute pressure. The plotted results are overpressure, namely T-1. The process described above was repeated for a sequence of times at each gauge location to provide the time histories.

Calculation of Pressure Impulses

The hydrostatic and total pressure-time histories were integrated using the trapizoidal rule. Because of the lack of spacial resolution which is an inherent limitation of the particle trajectory analysis method imposed by the finite spacing of the smoke puffs, some of the pressure-time signals show a rounded leading edge. As discussed in Volume 2, this is an effect of the analysis method and not an indication of a real distortion of the pressure pulse. Therefore, the impulse integral at the leading edge was calculated by joining the peak pressure value (calculated from the shock velocity) to the maximum value in the pressure-time history obtained from the particle trajectory analysis.

Results

The results are presented in Figures 1 to 8. In each case the pressure and impulse curves obtained electronically (Keefer and Reisler, 1975) are shown as solid curves. The corresponding results obtained from the particle trajectory analysis are shown as dotted curves. For each such set of curves an arrow on the pressure axis indicates the peak value of pressure calculated from the shock velocity; that is, the initial value used in the impulse calculation.

Discussion

The pressure and impulse curves obtained by the two completely different techniques, in general are in excellent agreement. The good agreement between the total pressure curves is particularly gratifying since this is the first time that such a comparison has been possible. This agreement would appear to validate both of the measurement techniques, and the compressibility corrections which were applied to the dynamic pressures. The hydrostatic overpressure results show agreement which is not as good and in this case one should suspect the particle trajectory analysis results as having the greatest error since hydrostatic pressure is the least accurate physical property obtained using the particle trajectory analysis technique. As explained in Volume 2, the finite spacing of the smoke puffs results in both a poor definition of the pressure and density histories close to a shock front and the poor detection of weak subsequent shocks, which are clearly detected by the pressure transducers. These errors are not as great for the total pressure which is derived in part from the dynamic pressure. Although dynamic pressure involves the density, its major factor is the square of the particle velocity, the most accurate measurement that can be obtained from the particle trajectory analysis.

Efforts are being made to improve the resolution of density and pressure obtained from the particle trajectory analysis.

No attempt is made at this time to draw conclusions from the results presented here concerning the shock waves produced at the interaction plane and over the ground surfaces. Such matters will be considered in detail in a subsequent report.

Preface

The authors gratefully acknowledge the assistance of John Keefer, Ralph Reisler and Lynn Kennedy in making available the gauge results and information concerning the calculation of compressibility corrections.

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Keefer, J.H., and R.E. Reisler. 1975. Multi-Burst Environment - Simultaneous Detonation Project Dipole West, BRL Report No. 1766.

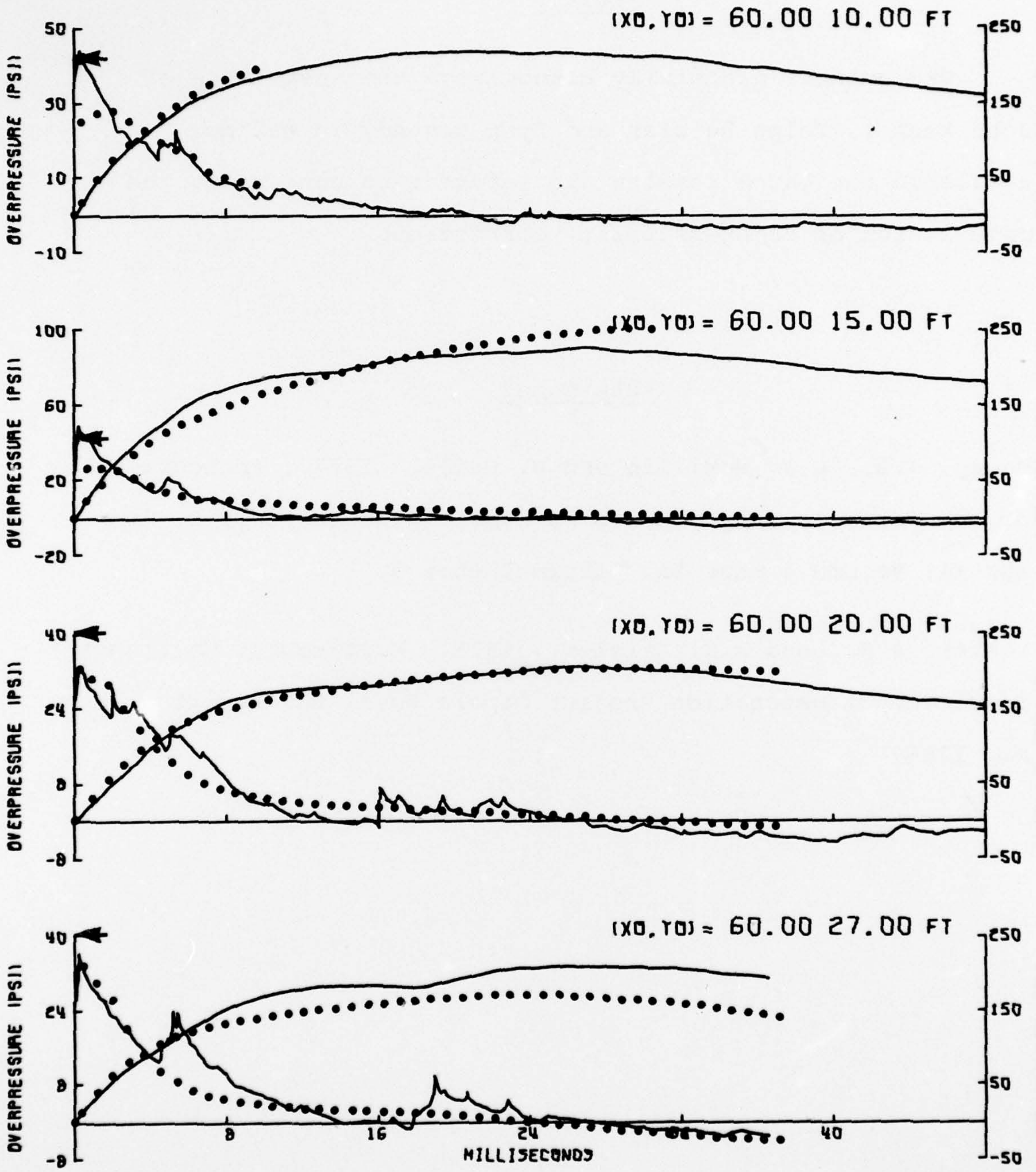

Fig. 1. DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

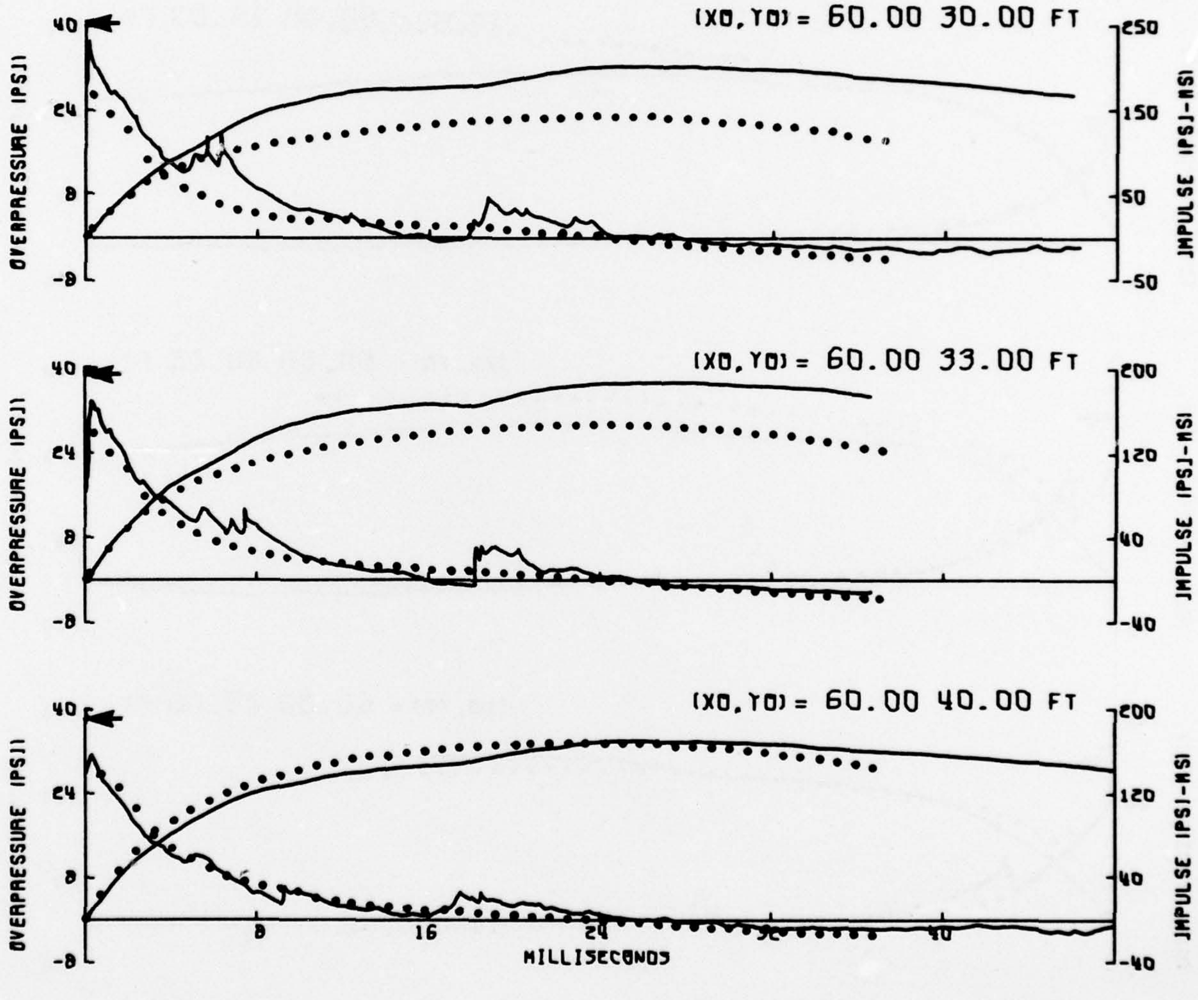

Fig. 2. DIPOLE WEST/10 HYDROSTATIC OVERPRESSURE

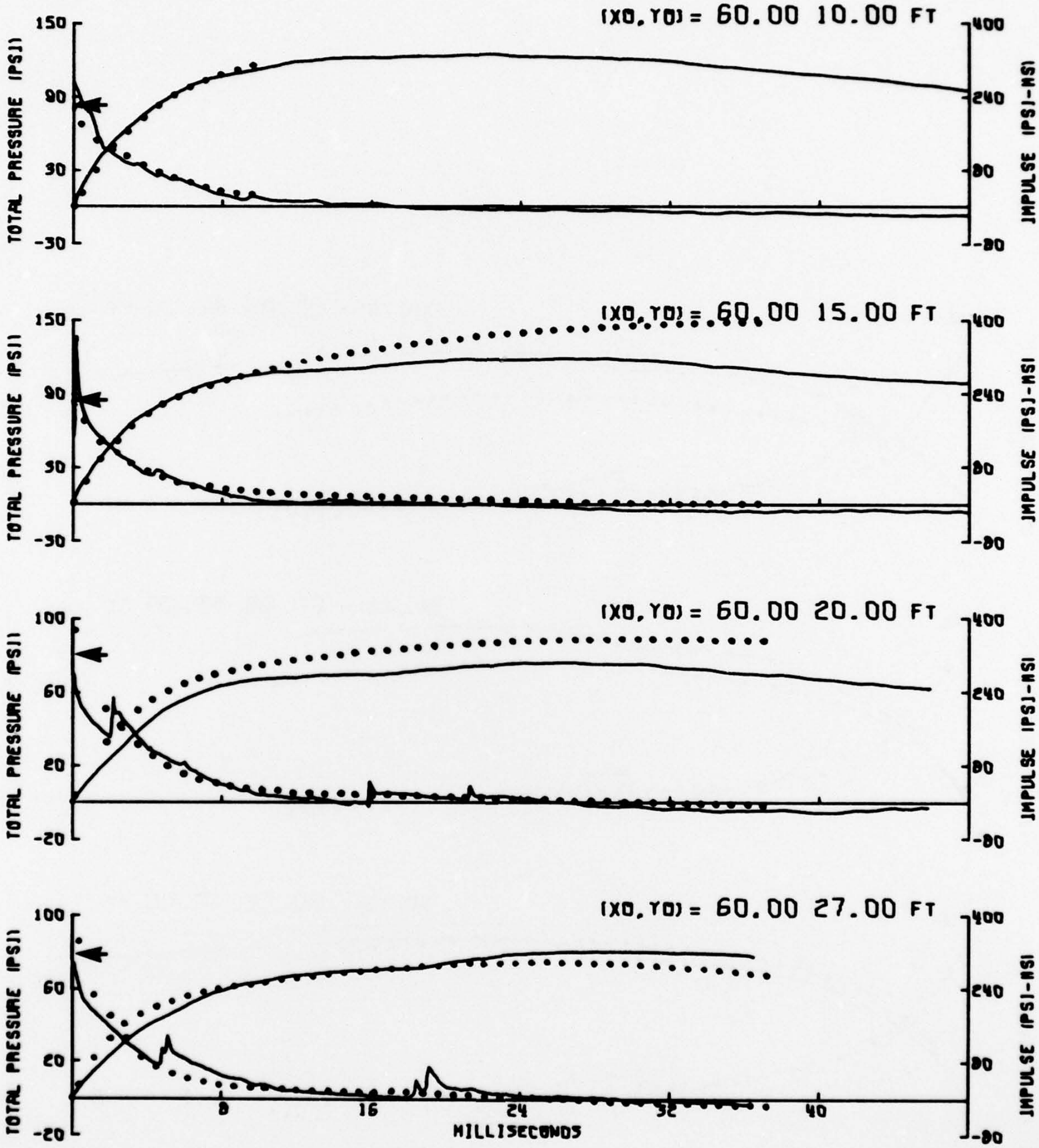

Fig. 3. DIPOLE WEST/10 TOTAL PRESSURE

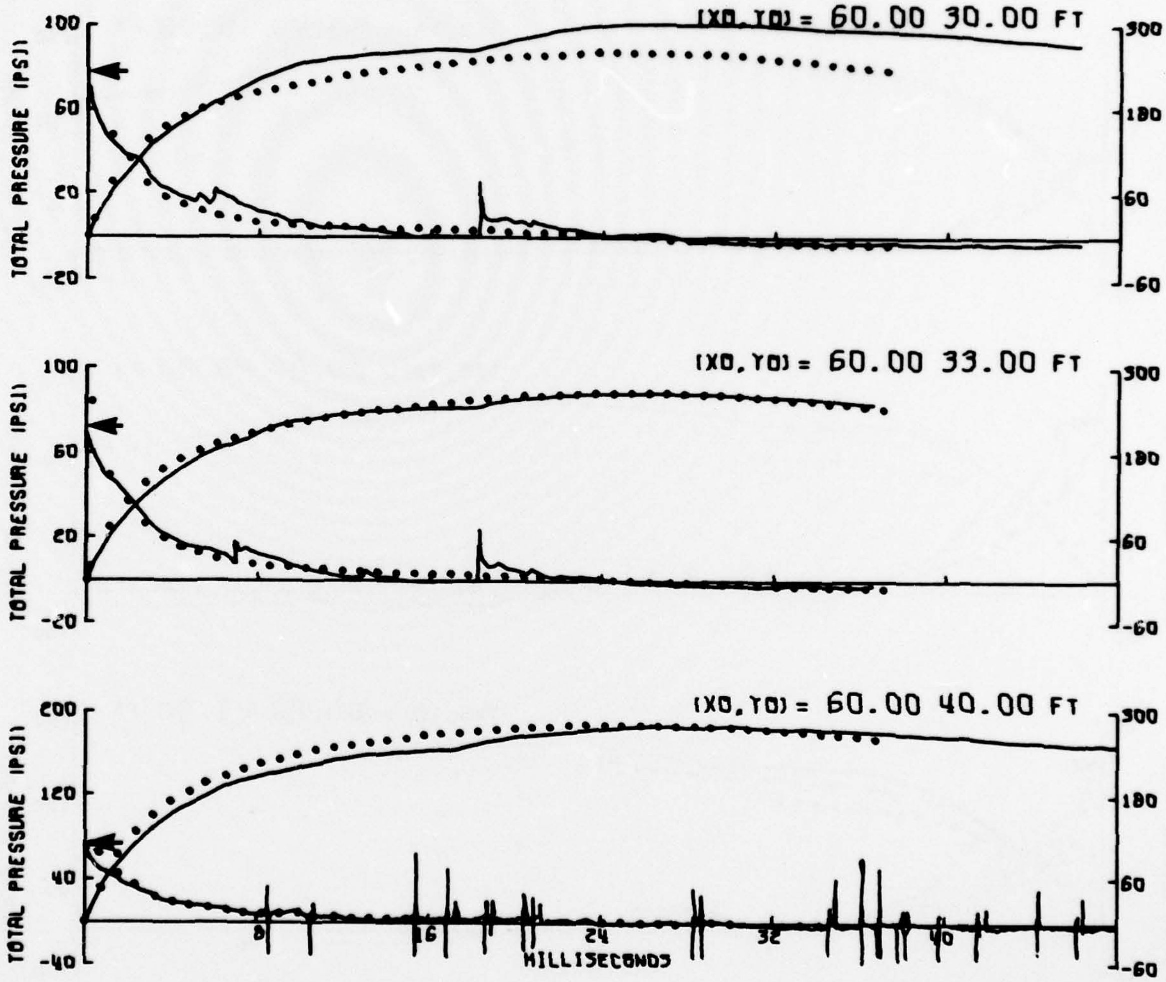

Fig. 4. DIPOLE WEST/10 TOTAL PRESSURE

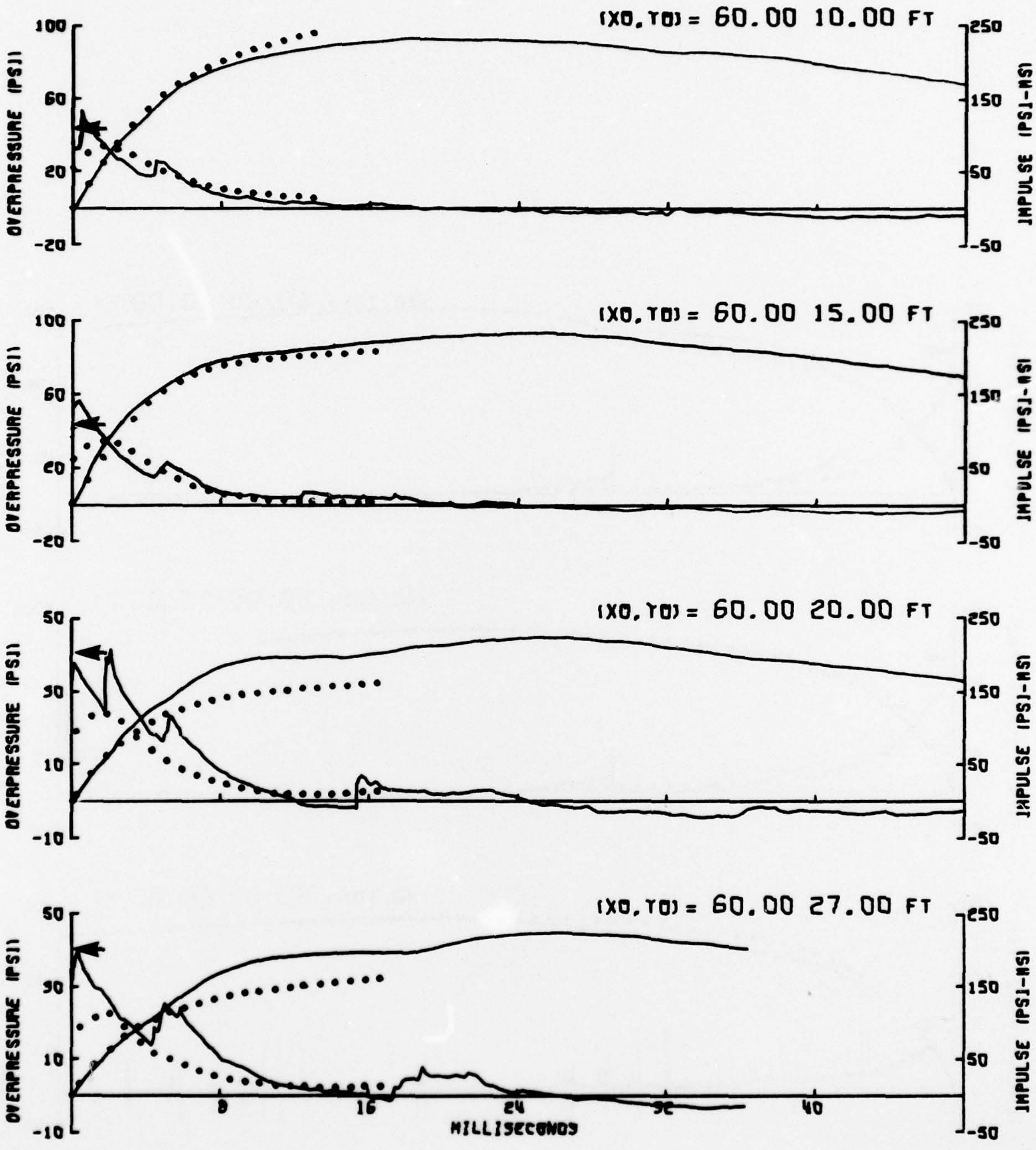

Fig. 5. DIPOLE WEST/9 HYDROSTATIC OVERPRESSURE

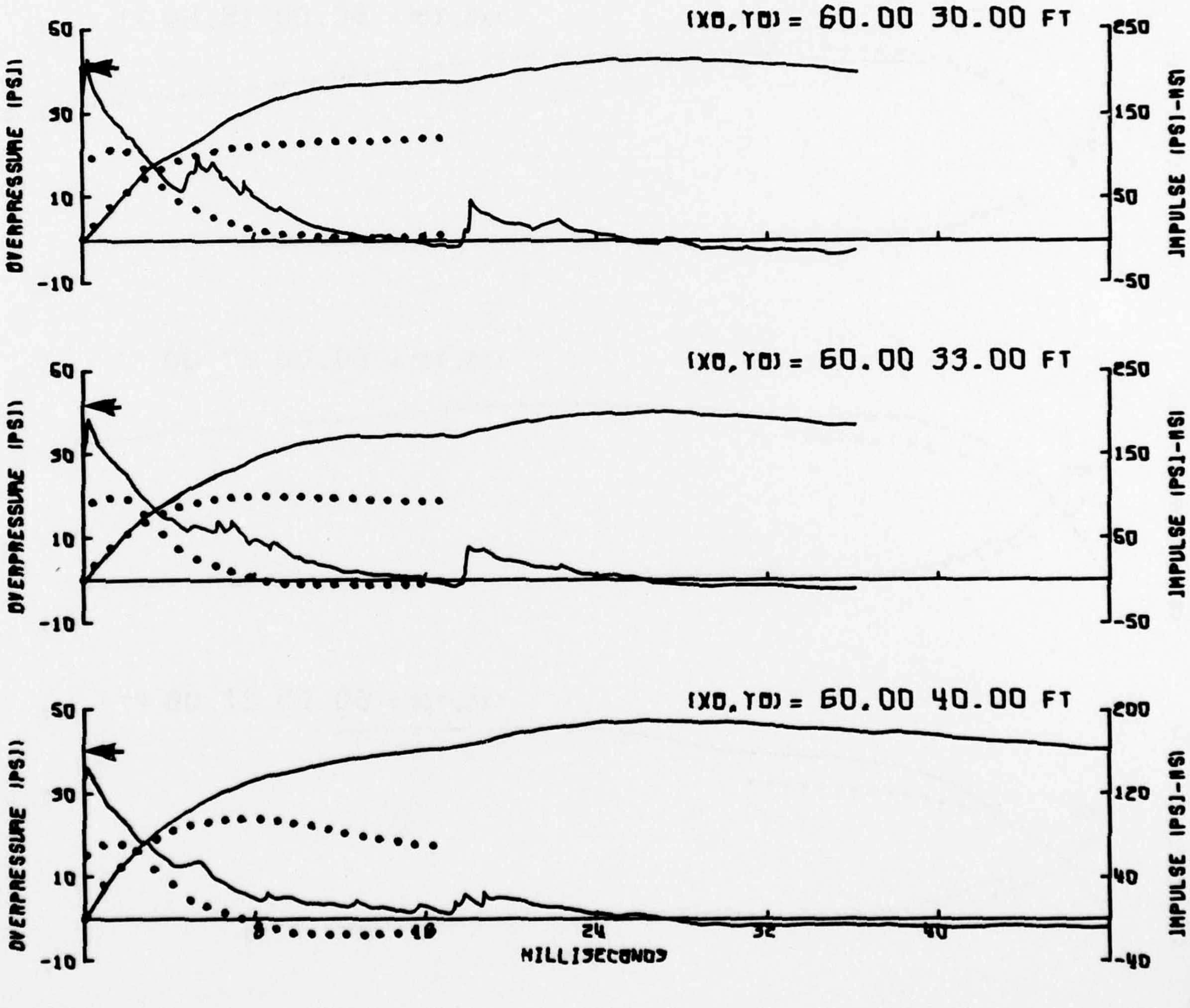

Fig. 6. DIPOLE WEST/9 HYDROSTATIC OVERPRESSURE

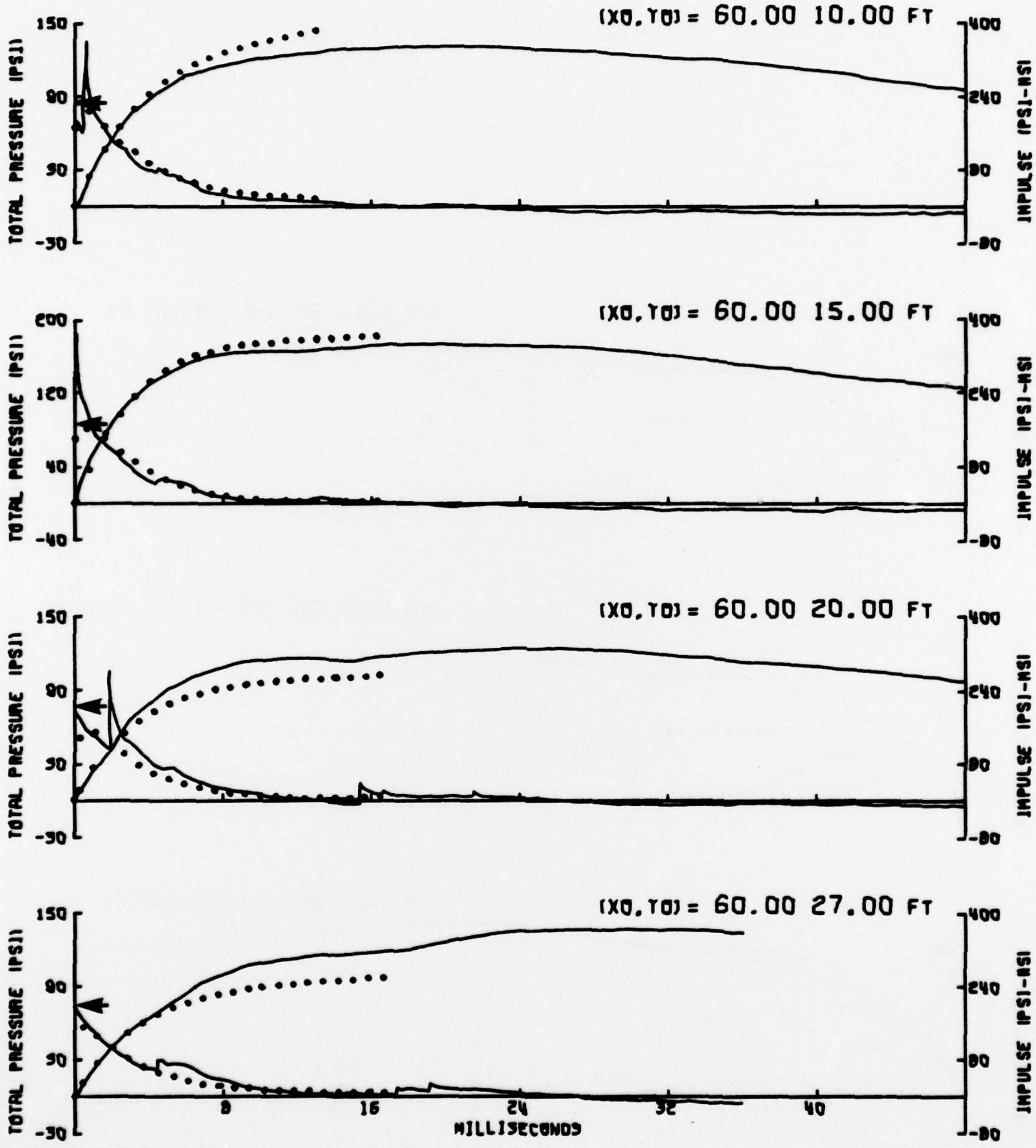

Fig. 7. DIPOLE WEST/9 TOTAL PRESSURE

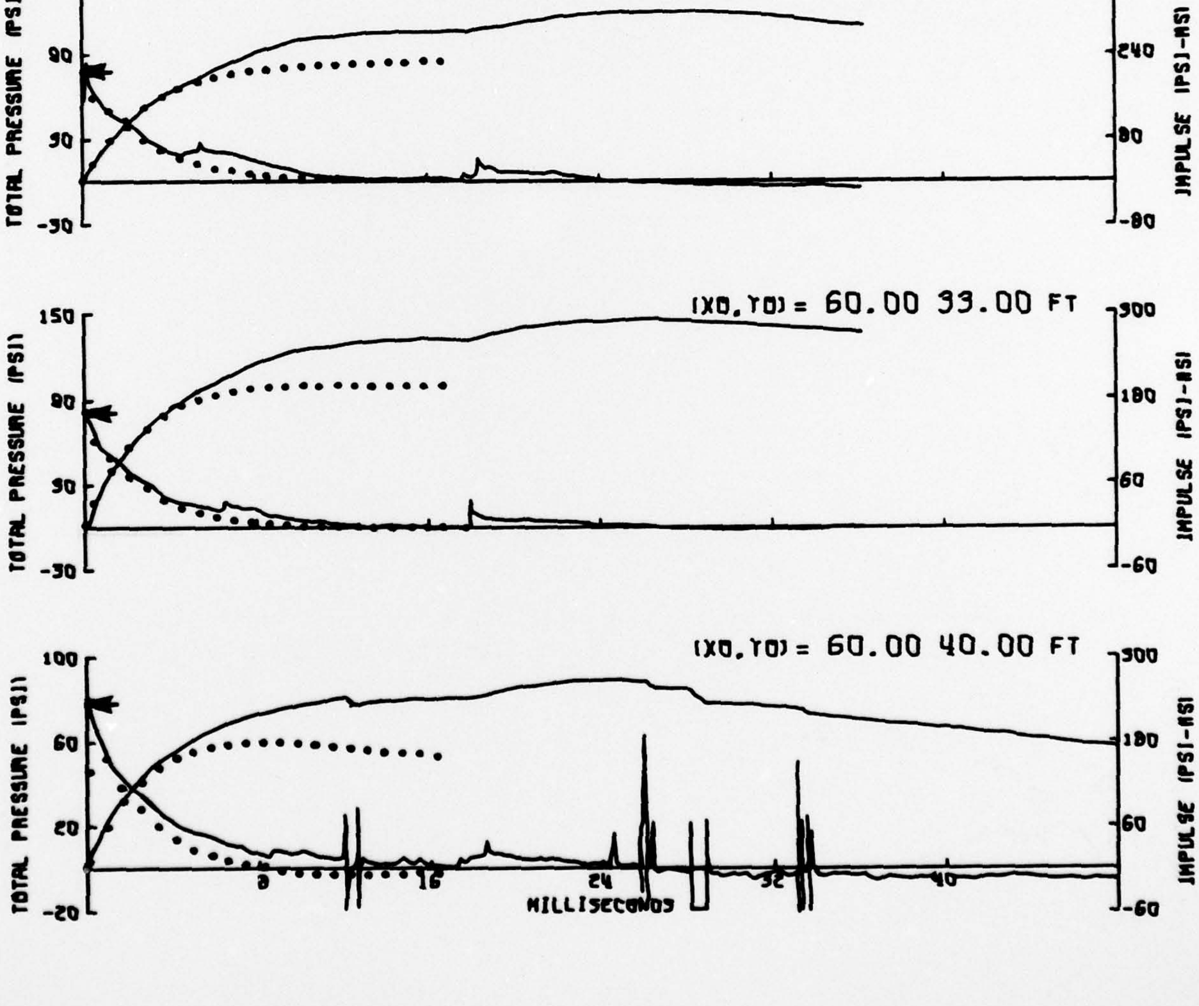

Fig. 8. DIPOLE WEST/9 TOTAL PRESSURE

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